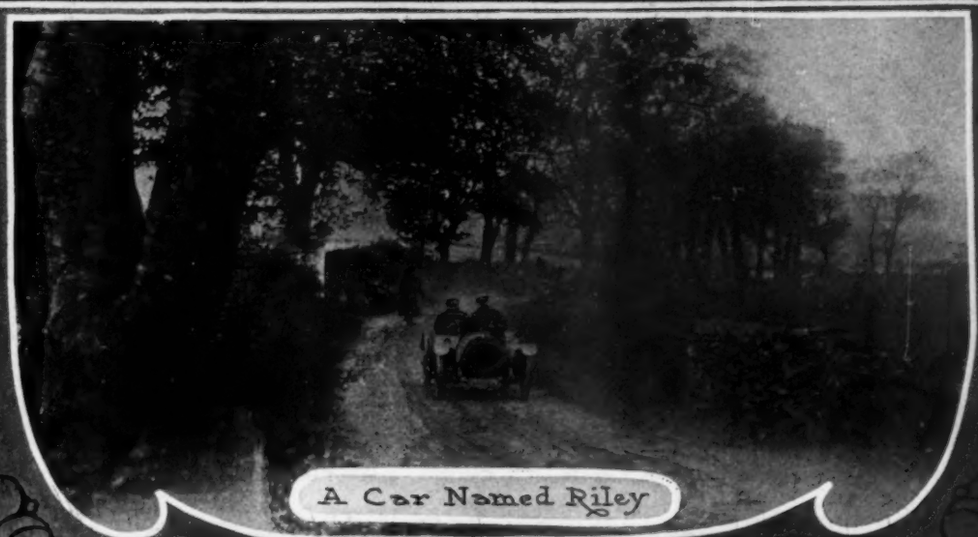
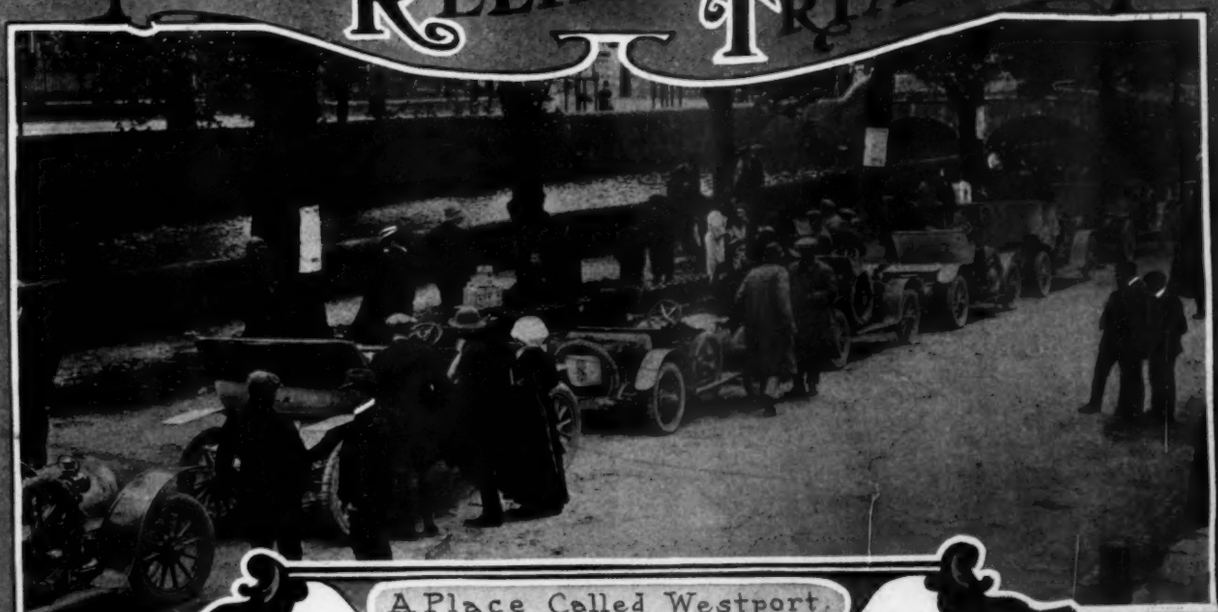
THE AUTOMOBILE



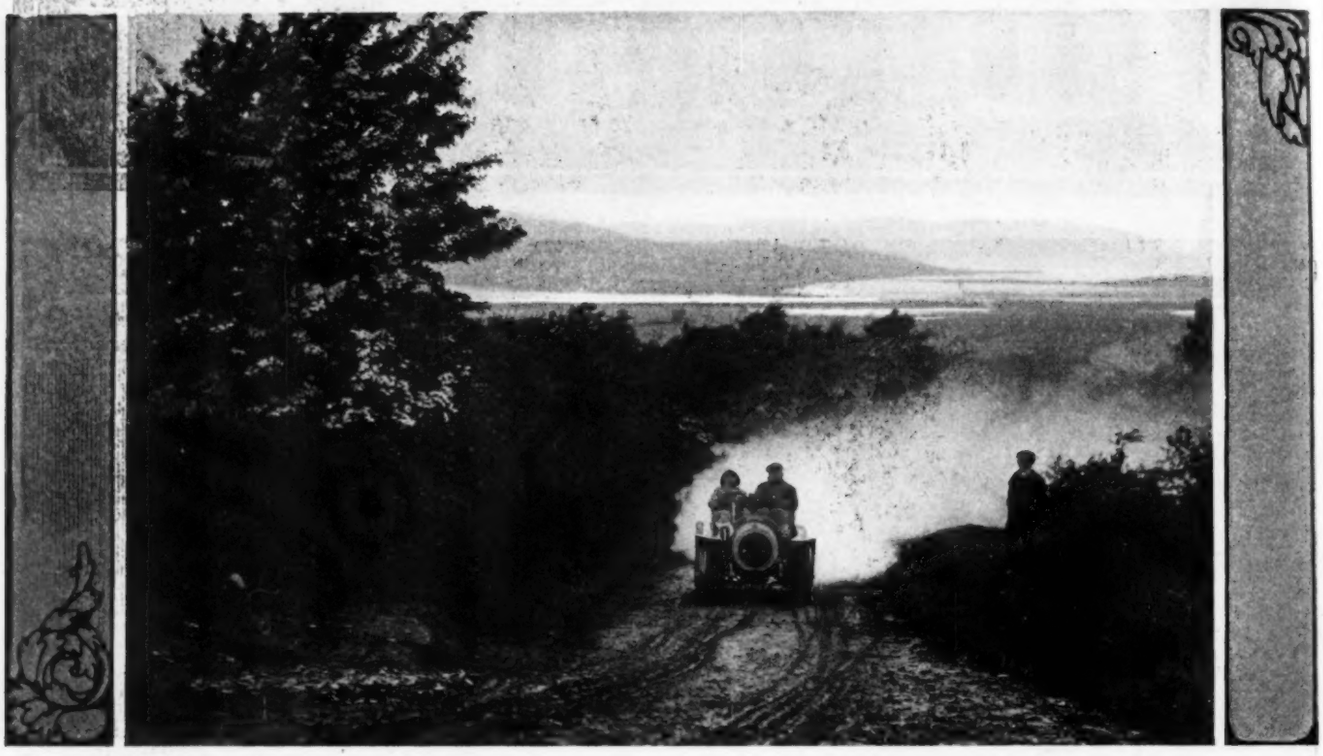
A Car Named Riley

IRELAND'S RELIABILITY TRIALS



A Place Called Westport.

DUBLIN, May 23—Nigh onto a thousand miles of the hardest roads, steepest hills, and most beautiful scenery of Ireland, famous for all three, constituted the task set the fifty and odd starters in the Irish reliability trials, which started on May 26 and continued excepting Sunday, May 30, until June 1. In this week



Marlborough Car Climbing Speencgue Hill, from Which a Beautiful View of Ireland's Charming Lakes is Obtained

with six days of hard work was crowded a complete circuit of the Emerald Isle, with its attendant difficulties, to say nothing of very sharp competition among the contestants, and all the discouragement possible from the very frequent rains.

The trials really started in Dublin, Tuesday, when the contesting cars were officially received, measured and weighed. The rules required certain maximum and minimum body dimensions but the weight was only restricted as to upper limit. The body sizes came near disqualifying two cars, the 15-horsepower Deasy being a quarter of an inch short at the back height of the tonneau. This was fixed to conform with the rules by removing the leather upholstering and adding a piece of wood, upon which the leather was replaced. Another prospective contestant, the Adler, was disqualified for being below official dimensions.

After measuring, the cars were emptied, and weighed. Then they were parked for the night at Ball's Bridge, under the care of the Irish A. C.

Tuesday morning, the cars began upon the first day's share of the circuit, the run being from Dublin northward to Ballycastle, then west to Portrush, following the east seacoast for the first 50 miles. The whole distance for the day was 177¾ miles,

On the Way to Dundalk—Deasy Car in Foreground

and this was followed by an easier day of but 160 miles to Bundoran, via Londonderry, near which a stop was made for the hill climb. This was up Greenane hill, and was preceded in the morning by the speed tests on Magilligans strand, just out of Portrush. Although shorter in miles than the day before, this was no snap, the winding roads around dangerous points, and the passage through Barnesmore Gap, before reaching Donegal, being such as to test the car's and the driver's ability.

Friday, the cars that had survived up to that point, traveled on to Galway by way of Swineford, and along the west coast with a side trip to Ballinarinch, where a beautiful view of the Atlantic Ocean was obtained. This made a run of 165½ miles, and gave the survivors a total of 503 miles.

Galway-Killarney gave the tourists the easy day up to then, the length of the course run over being only a distance of 146 miles, down the west coast, with a slight detour to pass through Limerick, where the noon stop for lunch was made.

The day's rest, over Sunday, at Killarney was augmented on Whit-Monday when the itinerary included the easiest, and by far the most pleasant trip of the trial, the circular run around the lake region. This is easily the most beautiful part of the country and although in a race, the magnificent scenery was enjoyed by all, particularly by the Limited Section, which included all of the private owners and drivers.

To offset the two days' rest, if it might be called that, the concluding day put the cars through their paces, being by far the longest, 187 miles of varying degrees of severity, and all of it such as to give the driver no moment of security. This took the contestants across the southern end of the island back to the starting point at Dublin.

The cars were well distributed through eight classes in the first section, open to all comers, and the second or limited section, which was restricted to *bona fide* members of recognized clubs, besides which the cars had to be driven by the entrant or a member of his immediate family. Nor was a professional driver allowed on the cars of this class, even as a passenger. This class was well patronized, 9 of the 54 entries being included in it, of which two did not start, one of these being the 16-20-horsepower Argyll in the limited class.

There were several notable additions of newcomers and a few

prominent absentees. Among the latter were the Swift cars which for the last two years have taken such a prominent place among the high score cars. The entry in Class A of the two Bedford cars was of great interest and their successive good performances were closely followed, for these cars were of a new design, frankly and avowedly copied after American lines. The two Bedford entries had four cylinder engines of 95 mm. (3¾ inch) bore and stroke. A planetary transmission in combination with shaft drive to the live rear axle was used. The other newcomers, whose entry attracted much attention, were the two-seated 12-14-horsepower Marlborough cars entered in Class C1. These weighed but 15 cwt. and carried four-cylinder engines of 80 mm. (3⅛ inch) bore and 100 mm. (4 inch) stroke.

The American cars among the starters were four in number, all products of the Cadillac factory at Detroit. They were well distributed over the list of classes, beginning with a single cylinder 10-horsepower in Class B, and including two 20-30-horsepower models in Class D, in which they competed with England's best in the small car line, most of the cars being of lower horsepower rating. Section Two, the Limited Section, also included one of America's representatives, another 20-30-horsepower Cadillac car. There were, as a whole, very few cars other than English make, either of home design and manufacture complete, or foreign design and home manufacture. Thus, aside from the Americans just mentioned, there were but three French and one German car, the former being a Chenard-Walcker in the same class with the one-lung Cadillac, and a pair of Motoblocs in Class E. The sole representative of the Germans was the 30-horsepower Adler in Class F, where Talbot, Gladiator, Vauxhall, and Sunbeam supplied worthy competition.

The complete list of entries was as follows:

Class A—Little Briton, 10-horsepower; Little Briton, 10-horsepower; Bedford, 15-18-horsepower; Bedford, 15-18-horsepower.

Class B—Briton, 12-horsepower; Chenard-Walcker, 8-9-horsepower; Riley, 10-horsepower; Adler, 12-horsepower; Cadillac, 10-horsepower; Rover, 8-horsepower; Bedford, 15-18-horsepower.

Class C—Chenard-Walcker, 12-14-horsepower; Riley, 12-horsepower; Star, 12-horsepower; Humber, 10-12-horsepower; Belsize, 14-16-horsepower.

Class C1—Star, 12-horsepower; Marlborough, 12-14-horsepower; Marlborough, 12-14-horsepower; Chambers, 12-horsepower.

Chambers Car Mid Pastoral Scenes at Ballriggan

Class D—Talbot, 12-horsepower; Cadillac, 20-30-horsepower; Gladiator, 12-14-horsepower; Cadillac, 20-30-horsepower; Star, 15-horsepower; Straker-Squire, 15-horsepower; Rover, 15-horsepower; Rover, 15-horsepower; Humber, 16-horsepower; Humber, 16-horsepower; Mass, 15-horsepower.

Class E—Talbot, 15-horsepower; Vauxhall, 20-horsepower; Vauxhall, 20-horsepower; Vauxhall, 20-horsepower; Armstrong-Whitworth, 18-24-horsepower; Motobloc, 18-22-horsepower; Deasy, 15-horsepower; Motobloc, 18-22-horsepower.

Class F—Talbot, 25-horsepower; Adler, 30-horsepower; British-Gladiator, 18-24-horsepower; Vauxhall, 24-horsepower; Sunbeam, 20-horsepower.

Class G—Gladiator, 40-50-horsepower.

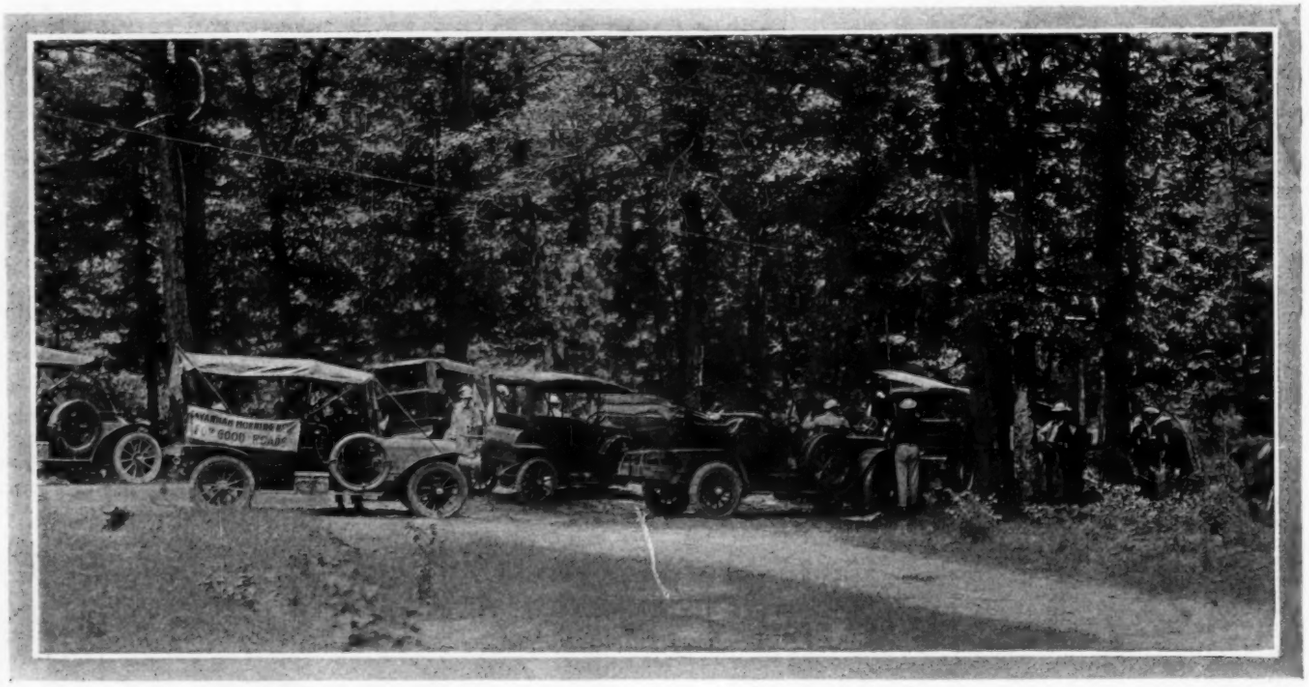
Section Two (Limited)—Metallurgique, 12-horsepower; Peugeot, 10-12-horsepower; Austin, 15-horsepower; Metallurgique, 18-horsepower; Marlborough, 15-horsepower; Argyll, 16-20-horsepower; Clement-Talbot, 20-24-horsepower; Cadillac, 20-30-horsepower; Germain, 22-horsepower.

Of these, all appeared at the starting line, ready for business, excepting only one Motobloc in Class E and the 16-20 Argyll in the section for amateurs, as well as the 10-12 Peugeot and 20-24 Clement-Talbot in the same class as the Argyll, which latter were withdrawn several days before the start.

Mass Car Has Interested Spectators as It Climbs Up the Slopes of the Famous Speenogue Hill

SAVANNAH HAS DOUBLE TIE IN FIRST ENDURANCE

SAVANNAH, GA., June 7—Double ties; Chalmers-Detroit and E-M-F in the first division and Packard and Acme in the second were the results of the first endurance run of the Savannah Automobile Club Monday between this city and Augusta, a distance of 135 miles. In the nature of a good roads campaign, in connection with the tide of enthusiasm for better highways now sweeping through the State, this event was begun with 17 automobiles, and 14 of these finished as contestants, the entire party being increased in number by additions from cities and towns along the route. At all points the purpose of the contest was fulfilled, for the inhabitants turned out in force, and wherever the subject of roads was mentioned there was always a hearty response in favor of anything which would hasten their coming.



A Rest of Two Hours at Picturesque Scarboro (Where Dinner Was Taken), Five Miles from Sylvania

The South has had no endurance contests of this kind, and the run of the Savannah club was organized with a maximum and minimum time schedule, no car being allowed to reach Augusta before 7 o'clock in the evening, while those reaching the finish after 8 o'clock were penalized 25 points, and any being over five hours late were disqualified. The rate of 25 points per hour was arranged, and only one car was disqualified for being late beyond the limit, a Buick driven by W. H. Connerat.

An early start was made on the morning of May 31 from Liberty and Bull streets, with the cars at intervals of 100 yards apart, following President Frank C. Battey's Stevens-Duryea, which acted as pilot and confetti car. As far as Montieth, which was reached at 6.55 A.M., the roads were through Chatham County and were fine, but from that point to Rincon the worst of the entire run were found. In attempting to dodge one of the holes on this, the Packard of N. G. Brown went in to the hubs, and it required the assistance of several cars and four mules to draw the machine out of the bog. Rincon to Springfield, 27 miles, was made in one hour and forty minutes, and when the latter was reached the whole town had turned out to greet the autos. Mayor McLoud joined the Savannah Club for the remainder of the trip. The pilot car took the wrong course after leaving Springfield, and about 15 minutes were lost in regaining the route. Harvey Granger's Stevens-Duryea lost its muffler at this point. At Sylvania, the county commissioners—S. B. Lewis, J. O. A. Enecks, and C. S. Zeigler—joined the club in three White Steamers, driven by W. J. Hilton, C. M. Hill, and J. J. B. Morrell. After a short stop there the club drove to Jacksonboro Bridge, five miles away, where a rest of one hour and a half was taken for dinner. Comparatively slow time was made through the sand and sharp curves of Screven county to the Burke county line, after which the route was found to be almost a boulevard.

Waynesboro was reached one hour ahead of time and the citizens crowded around the cars. With the addition of E. E. Chance, chairman of the board of commissioners, Sheriff S. G. Story and J. P. Palmer, superintendent of roads and bridges, the trip was resumed in a half an hour. Because of the good condition of the cars at this point, it was decided to abandon the schedule and make for Augusta in the shortest possible time. T. A. Bryson's Chalmers-Detroit 30 and C. Graham's E-M-F were the only cars in the first section which made the last stop within the scheduled time, thus winning their perfect scores.

In the second division N. G. Browne's Packard 30 and G. Mouro's Acme were the successful ones. President Battery was penalized 25 points in the first class and the others considerably more, but in the second class there were three cars which received but 25, the minimum penalty. Two Stevens-Duryeas and a Jackson, another Chalmers-Detroit, and a Franklin each received 50 points.

On Tuesday the Savannah club was taken to the Carmichael club for a real barbecue and for speeches by members of the Savannah club, as well as those from the Atlanta, Augusta, Waynesboro, and Athens, all on the subject of "good roads for Georgia." The time of the return trip to Savannah was optional to the tourists, some coming through on Tuesday night by moonlight and others on Wednesday morning. On the return trip Harvey Granger, in his Stevens-Duryea 60-horsepower, made the 135 miles in five hours and one minute, breaking the previous record of seven hours and a half. One cup was to have been given as a trophy, but now that four have come through tied

it is probable that a meeting will be called, and arrangements made to give four cups instead of one. Word has been received that the Motor Club of Augusta is now planning an endurance run to Savannah some time during the month, the date to be announced later.

Herewith is the summary of the run:

FIRST DIVISION

Name of Car	H.P.	Cyl.	Model	Entrant	Driver	Penalty
Chalmers-Detroit	30	4	30	T. A. Bryson...	Bryson	Perfect
E-M-F	30	4	30	C. Graham.....	Mosher	Perfect
Stevens-Duryea.	35	6	U	F. C. Battey...	Battey ...	25
Buick	20	4	10	T. E. Youmans.	Youmans ..	50
Buick	30	4	17	R. V. Connerat.	Connerat...	100
Reo	24	2	H	C. Henderson..	Finney	100
Maxwell	10	2	Jr.	R. B. Brockett.	Brockett....	175
Buick	30	4	17	W. H. Connerat	Connerat ..	Dis.

SECOND DIVISION

Packard	30	4	30	N. G. Browne..	Browne	Perfect
Acme	35	4	19	G. Mouro.....	Mouro	Perfect
Stevens-Duryea.	60	6	Y	H. Granger.....	Mahoney ..	25
Jackson	30	4	E	J. C. Manning.	Delph	25
Stevens-Duryea.	24	4	X	A. W. Solomon	Solomon ...	25
Chalmers-Detroit	30	4	30	T. A. Bryson...	Thompson .	50
Franklin	20	4	15	J. S. Weeks....	Weeks	50
Franklin	20	4	G	R. R. Oakman.	Oakman ...	D. O.

Meet at Fitzgerald, Ga., Is Postponed

SAVANNAH, GA., June 5—The three-day race meet scheduled for June 15, 16, 17 at Fitzgerald has been postponed until the middle of August. The reason is because the roads just graded are too soft for safe speeding, and with sixty more days in which to work on them the course will be in perfect condition.

SAVANNAH STILL HAS GRAND PRIZE HOPES

SAVANNAH, GA., June 5—More hope is now entertained for a grand prize race in Savannah than at any other time. A special meeting of the Savannah Automobile Club has been called, and a letter received from the Automobile Club of America will be submitted and gone into thoroughly. It is this letter that has caused the Savannah Automobile Club to feel that there will be a race, though if a race is to take place it will have to be decided upon at once, so as to give the manufacturers a chance to prepare special cars. It is probable that a committee composed of Mayor Tiedeman, President Battey, Harvey Granger, and two others will leave no later than Wednesday for New York, where they will talk over plans for the last time on the Grand Prize race.

READVILLE RACES BEING WELL ENTERED

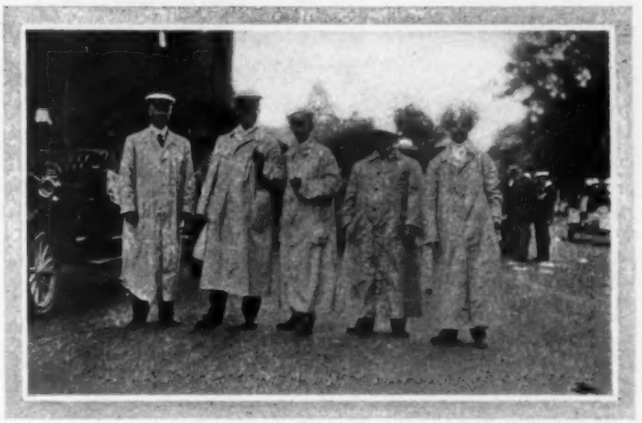
BOSTON, June 7—Enough entries have already been secured for the races to be held at Readville track, June 17, to insure the success of the meeting. A contract has been signed by Ralph DePalma, driver of the Fiat *Cyclone*, and Charles Basle, driver of the Renault racer, for a match event of 25 miles. The other principal event will be the 25-mile contest for the Harvard trophy, with $800 additional in cash to the winners of first, second and third places. Basle and DePalma will drive in this race. There are six other events, and among the cars that have been entered are: Stearns, Allen-Kingston, Alco, Chalmers-Detroit, Knox, Columbia and Morse.

The Morse is a new car built in Boston and will make its début at Readville.

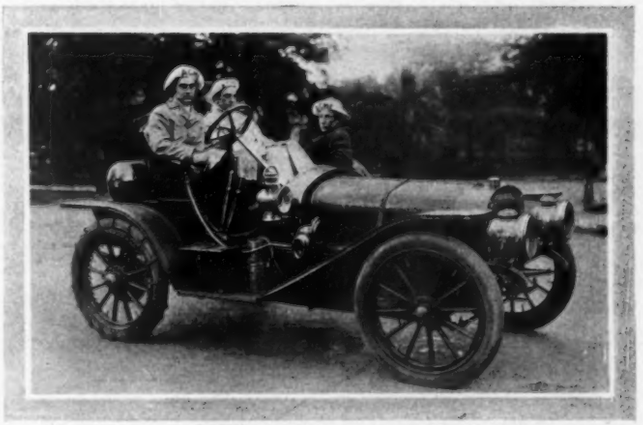
HARTFORD SOLVES ENDURANCE RUN TIE

HARTFORD, CONN., June 7—Copper trophies, thirteen of them, will be given by the Automobile Club of Hartford to those who made perfect scores in the recent endurance contest. There were 15 clean record cars but two of these, the Renault and the Maxwell Junior won their respective classes, leaving the bakers' dozen deadlocked. Albert M. Kohn, chairman of the contest committee in the absence of H. P. Maxim, is a manufacturing jeweler and he has arranged for the copper cups, each to be suitably engraved. In addition, a sterling silver club pin will be given to the successful drivers.

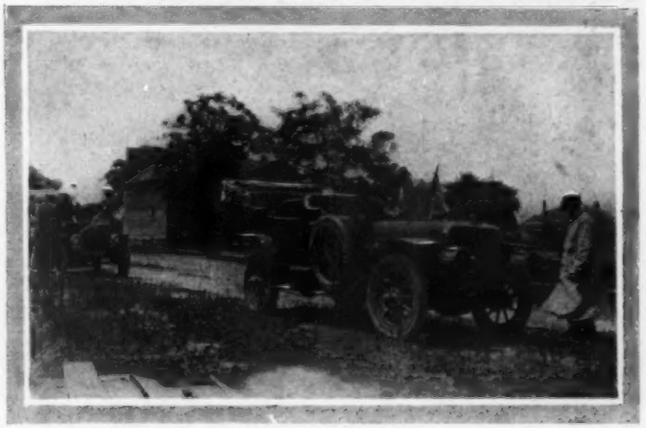
Maxwell, Lowest-Powered Car to Make the Trip



Judge Cann, Messrs. Bacon, Granger, West, and Solomon



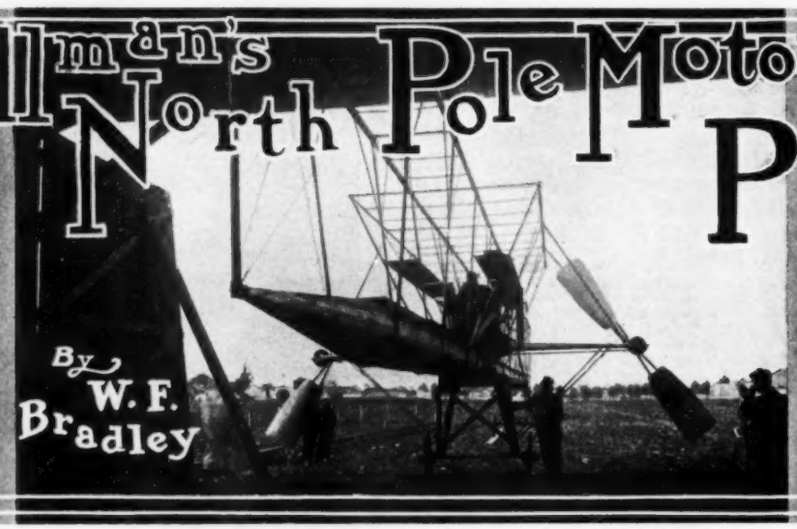
The Acme Driven by Mouro, with a Perfect Score



Stevens-Duryea Which Lowered the Road Record

Wellman's North Pole Motoring Plans

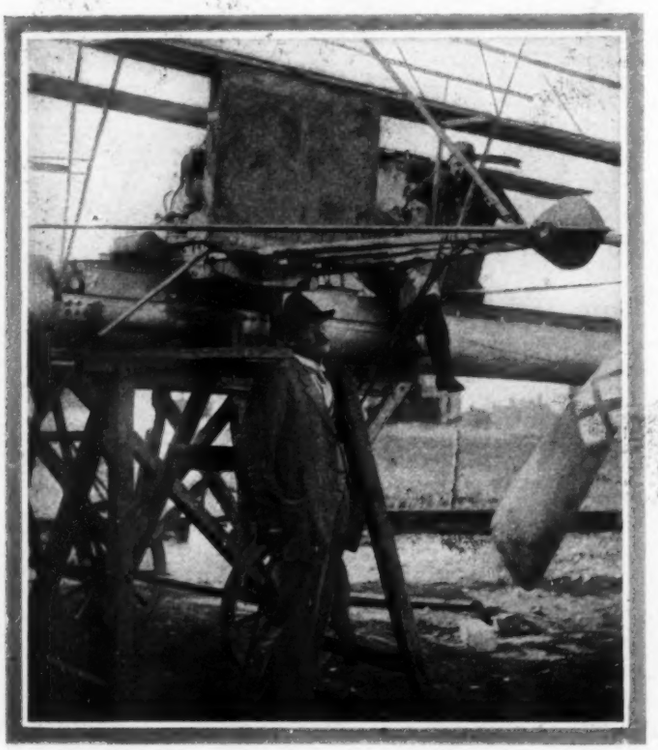
By W. F. Bradley



Steel Car of Wellman Airship "America" That Is Fitting Cut in Paris for the Perilous Trip to the North Pole

PARIS, June 3—Walter Wellman's first action on arriving in Paris was to visit the private workshop in the suburbs where, under the direction of Chief Engineer Melvin Vaniman and a group of American mechanics, the steel car of his airship *America* is being fitted out for its journey to the North Pole. Work is so far advanced that the ship will leave Paris very early this month for Spitzbergen, via Antwerp, to be followed by Walter Wellman, Melvin Vaniman, and the third member of the crew yet to be selected.

It is the same airship, modified and improved where previous experience has shown improvements were possible, which was used for the 1907 expedition to the Arctics. The steel car has a total length of 115 feet, and carries two gasoline engines, one an 80-horsepower four-cylinder model, driving two huge steel propellers, and the other a slightly lower powered eight-cylinder model driving a pair of wooden propellers capable of being pivoted on their axis in order to drive the airship horizontally or at any required angle from the horizontal.



Walter Wellman by the Side of His Airship

Some interesting tests were made this week with hydrogen gas as fuel. Normally the engines run on gasoline, of which 1,200 gallons are carried in the fourteen tanks forming the tubular keel of the ship. As this fuel is consumed, the weight of the airship will be reduced to such an extent that there will be hydrogen gas to spare. Instead of letting it out into the air, Engineer Vaniman has devised a system of burning it in the motors, a task which no other dirigible balloon pilot has attempted on account of the danger of fire.

Two carbureters are employed, one being an ordinary type working with gasoline, and the second a special appliance intended to mix hydrogen and air. Only one set of intake pipe are employed, arranged in such a way that a single throttle will allow of running entirely on hydrogen, entirely on gasoline, or on any proportions of the two. Experiments made at Spitzbergen in 1907 showed that the engine could be started much more readily on hydrogen than on gasoline. The tests this week further proved that the engines ran faster, with less vibration, and developed more power with the pure hydrogen mixture than with the best gasoline charge. Some further adjustments were required in order to make it possible to switch over from gasoline to hydrogen, or vice-versa, without a momentarily slowing down of the engine, but the value of the two fuels working together was undeniable. It was distinctly noticeable that the hydrogen mixture fired much more readily than the gasoline one, and that for a given number of revolutions the spark needed retarded less for the former than for the latter fuel. The experiments will be continued with a view to getting very accurate data on the hydrogen consumption per horsepower hour, as well as the best proportions of air for the two fuels.

JUST LIKE EARLY DAYS OF AUTO RACING

PARIS, June 3—The official opening of the Juvisy aerodrome, intended as the triumph of the aeroplane, and the inauguration of a period when flying machine races would supersede automobile speed tests, resulted in proving quite other things than the promoters had intended. Conditions of the aerodrome and its inauguration were ideal. The ground, situated about ten miles to the south of Paris, is a vast level field, surrounded by grand stand, aeroplane sheds, workshops, etc. For the Sunday inaugural meeting nine aeroplanes were promised, weather conditions proved to be ideal, and in the hope of seeing an altogether new sport a crowd estimated from 30,000 to 50,000 people traveled out to the aerodrome, filling every available space.

After two hours cooking under a hot sun, the easy-going spectators at last lost patience in the kite demonstrations, broke down the barriers and advanced in two solid masses across the field to inquire why they were not getting their money's worth.

The twelve mounted gendarmes were worse than useless, for they only served to irritate the people by their opposition, and for over an hour the officials were kept prisoners in their offices while the people outside clamored for the return of their money and let loose their wit at the expense of the organization.

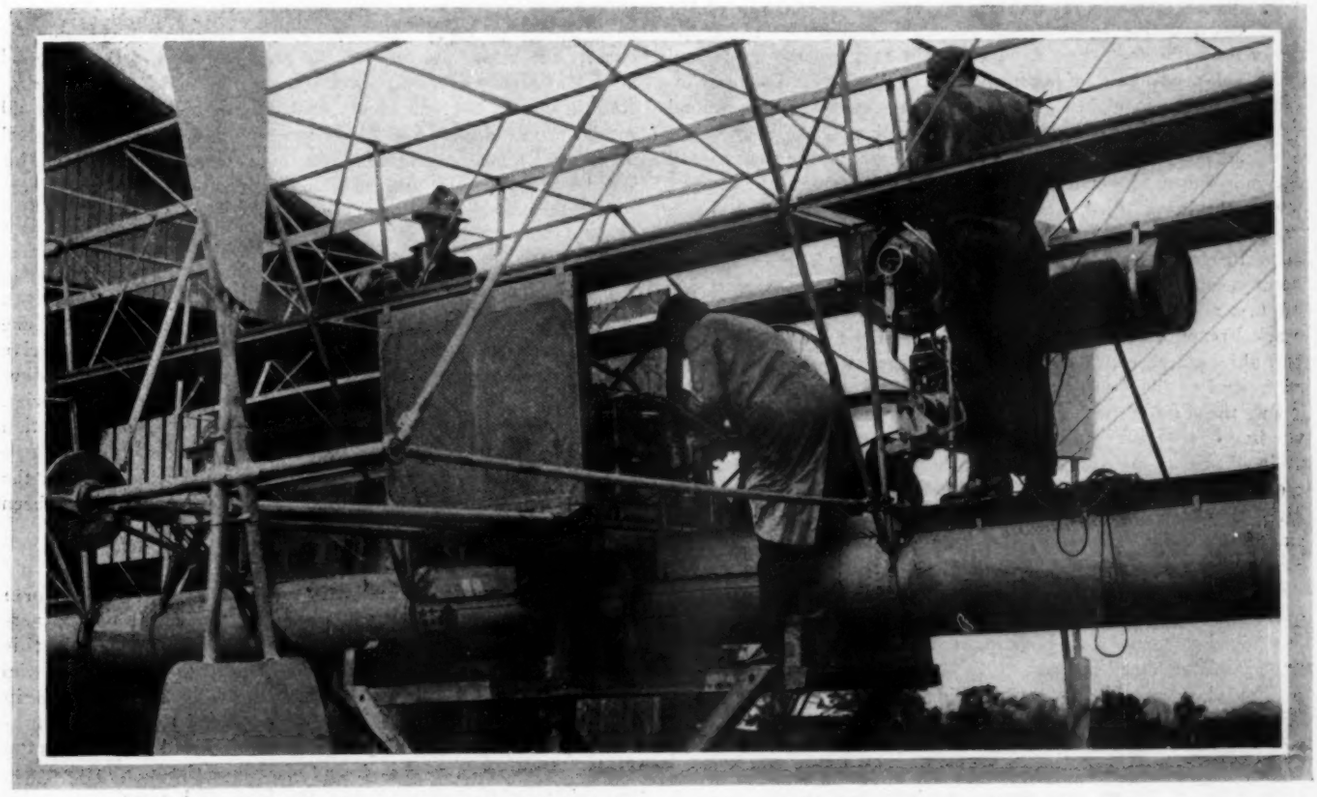
After considerable effort on the part of the police, members of the committee and self-enrolled guardians, the ground was sufficiently cleared to allow Leon Delagrange to get away on the old Voisin biplane with which he made his records in Italy last year. The flying machine, however, was not in a flying mood, the net result being a skim over the ground with an occasional jump into the air. The De Pischof, a badly executed copy of the Wright, was still less capable of flying, and after ten minutes on the ground was wheeled back to its shed and the shutters drawn down. Later Delagrange made further attempts, but his best performance was one round of the field, about three-quarters of which was in the air. Rougier, the ex-Dietrich race driver, who had made a flight of 25 miles the previous day, attempted to save the situation on his new Voisin flyer, but after one minute skimming the machine dived, sticking its nose in the soft ground and throwing its tail in the air. The driver was in no way injured, but his machine was too much damaged to make further flight possible.

Finally, when the spectators had gone home in disgust at the flying machines which were unable to fly in the gentle summer zephyr, Delagrange came out again on Captain Ferber's flyer and for ten minutes made a magnificent flight, at a height of about forty feet from the ground. It was too late, however, to undo the bad impression created, and in the minds of the Parisians the word aviator is synonymous with bluffer and the managers of the Juvisy aerodrome are guilty of getting money under false pretenses.

Making "Snake" to Be Used on Wellman Expedition

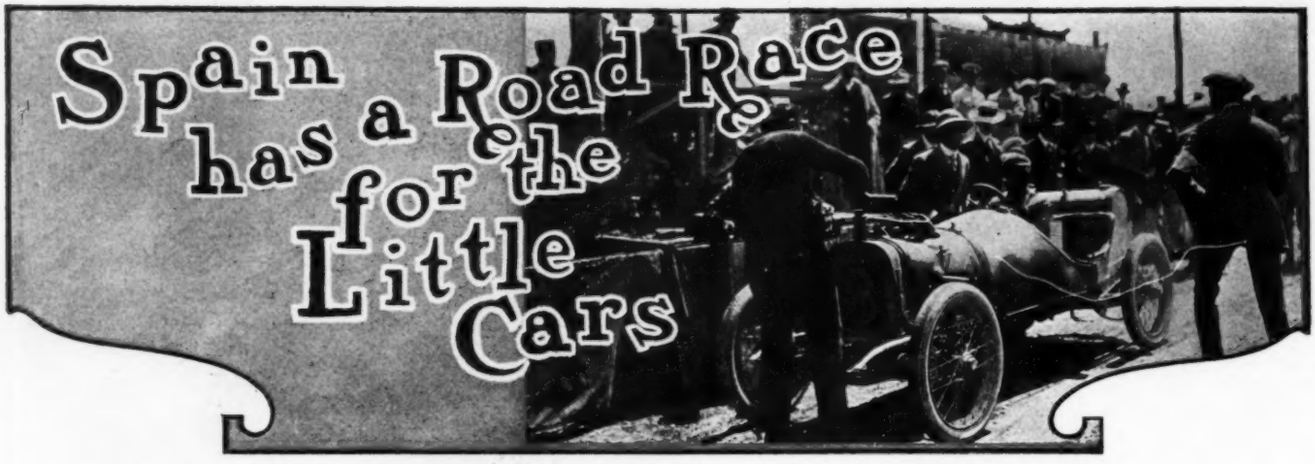
WRIGHTS WILL GET THEIR MEDALS TO-DAY

WASHINGTON, D. C., June 10—President Taft will to-day present to Wilbur and Orville Wright the gold medals of the Aero Club of America. In the morning it is planned to have a demonstration flight by one of the Wright brothers, if conditions are favorable, and at half past twelve a luncheon will be given the Wrights and the members of the Aero Club of America by the Aero Club of Washington, at the Cosmos Club. At half past two the presentation ceremonies will begin in the East Room of the White House, where President Taft will officiate. There will be present at the ceremony an array of Senators and Congressmen, the diplomatic corps, and the officials of the great scientific bodies of the country, making the assemblage one of the most brilliant and representative that has ever been seen in the national capital. The Aero Club of America, which has its headquarters at the New Willard hotel, is present in a body.



Engineer Vaniman Making Adjustments to Hydrogen Carbureter on Airship "America"

Spain has a Road Race for the Little Cars



Driver Goux Taking on Supplies for His Winning Lion Peugeot, in the Copa Catalunya, at Barcelona, Spain

BARCELONA, SPAIN, June 1—Automobile racing being dead in France, it rested with non-sporting Spain to bring it back to life with voiturette race that had all the interest and all the excitement of any of the large international events. The cars were twelve in number, with single cylinders of 3 9-10 inches bore, or the equivalent where multiple cylinders were employed, but were none the less interesting by reason of their smallness, for the French specialists have found the secret of developing 35 horsepower in this small diameter cylinder and of driving the cars at more than 50 miles an hour on level road.

Victory fell to Goux, on a two-cylinder Lion Peugeot of 3 1-10 inches bore by 7 4-5 inches stroke, with an average speed of 22.77 miles an hour for a distance of 225 miles. In considering the average it is necessary to take into account the fact that the course is less than 17½ miles round, that for a third of the distance it winds up a hillside, and that the frequent turns constantly kept the cars back.

Goux won the race with a large margin, for Georges Sizaire, who came in second, was 1 hour 19 minutes to the bad, but the race was none the less exciting for all that. On the first round Goux made the fastest time, covering the 17½ miles in 23.48, and being followed home by his team mate, Boillot, on a single cylinder car of 3 9-10 inches bore by 10 inches stroke, and a second car of exactly similar construction in fourth position, with Giuppone at the wheel. The only Spanish team in the race, small Hispano-Suiza four-cylinder cars of 2½ inches bore by 7 inches stroke, finishing third, fifth and sixth. Georges Sizaire, on a Sizaire—Naudin car of the same dimensions as the one-lunger, Lion Peugeots, broke a wheel on the first round, finishing in 1 hour 55 minutes 10 seconds, compared with 23 and 24 minutes for the first and second cars. It was a terrible handicap, and even the crack French driver appeared to look upon the task as hopeless, for, although he continued with his damaged wheel, he remained at the end of the list for the first five rounds.

But the Lion-Peugeot one-lungers were far too fast for the winding course, and after Boillot and Giuppone had both smashed their wheels on the dangerous turns and had been carried back to the grandstands on the rival but disabled Sizaire-Naudin, and after the same car had towed the damaged Demeester to the stands, Georges Sizaire came to the conclusion that something could be done. The rakish, big-bonneted blue car was jacked up, the damaged wheel replaced by a solid one, and with a handicap of 1 hour 50 minutes against him, Georges Sizaire rushed away at a speed of 55 miles an hour in an attempt to catch up with the flying and far-ahead leader.

First place at this time was being held by a four-cylinder Hispano-Suiza, with a similar car in second position and Goux's twin-cylinder Lion-Peugeot third. This latter had suffered serious damage to its radiator by a flying stone, and had to stop every eight miles to fill up with water. At half distance the Spanish Hispano-Suiza cars began to falter, two of them going out of the race and the third one being passed by the leaking Lion-Peugeot. Sizaire was now going all out, and, being slightly faster than the Lion-Peugeot, and not having, like this latter, to stop at intervals for water, was gradually lessening the distance between himself and the first car. Thanks to the dexterity of the Lion-Peugeot mechanic, the filling of the tank was a matter of seconds only, and with the big delay at the beginning Sizaire could not regain all of the ground that he had lost.

The race finished with Goux, on the two-cylinder Lion-Peugeot, first in 6.19.6; Sizaire, on single-cylinder Sizaire-Naudin, second, in 7.37.46 3-5; Soyez, on single-cylinder Werner, third, in 7.38 2-5, and Pileverdie, on a four-cylinder Hispano-Suiza, fourth, in 7.55.29.

This is the first time in any European voiturette race that multiple cylinder cars have made a really good showing. The reason of their victory lay entirely in the excessive speed of the single-cylinder models. The two Lion-Peugeot cars, with single-cylinder engines developing 35 horsepower, were too fast for the course, their disablement being caused entirely by the breakage of road wheels on turns. The handicap to the Sizaire-Naudin was exactly the same, and but for the hour lost on the initial round he would almost certainly have secured first place. The Sizaire-Naudin was a last year's car, while the Lion-Peugeots were all special productions, the single-cylinder models being very original by reason of their excessive stroke, high compression, high engine speed and three inlet and three exhaust valves spaced in a horizontal plane around the one cylinder.

The list of official observers for the Prince Henry tour reads like an extract from an army gazette, as the majority are officers and members of the general staffs of their countries. The German general staff will be represented by six majors, twelve captains and three lieutenants, besides which a great many other officers from different regiments will take part in this capacity, among them being Prince Franz Hohenlohe. With one exception the eleven observers Hungary is entitled to send are on the general staff, and this fact rather detracts from the character of the event as an ordinary tour, especially as permission has been granted for all to wear their uniforms.

The Swiss League Council is working at a set of uniform regulations governing motor traffic for the whole of Switzerland, as urgent representations have been made to this end by the hotel and inn-keepers of the republic, who are feeling severely the losses brought by the decrease in motor traffic. It was hardly to be expected that the automobiling public would calmly stand the hundred and one pettinesses of each canton and tiny parish without some return, and this took, to a great degree, the form of boycott.

Exhaust Side of Automobile Motors

By Thos. J. Fay

Part I

CONTINUING ON, from the fuel, after it has performed its quota of work, to the maximum possible extent, in view of the limitations imposed by motors, it becomes necessary to treat with the products of combustion, rather with the expectation that the mere question of noise and its elimination will not constitute the whole theme. This story of the exhaust will have to be divided up somewhat, owing to the differences that can be noted if the air-cooled problem is separately handled.

Exhaust Manifolds Used in Water-Cooled Motors—It was pointed out in the discussion of fuel how some designers attempt to gain power by inducing a vacuum in the exhaust manifold, and the question here is, how can the design be consummated in

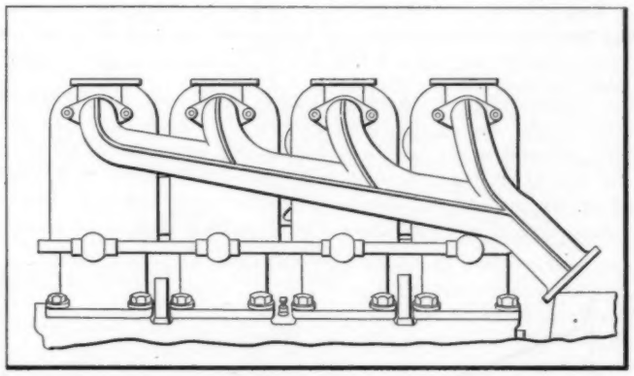


Fig. 51—Suitably proportioned exhaust manifold used on a two-cycle motor of the individual cylinder type

order not to lose power in the manifold? Certainly, it is important to avoid the loss of power due to imperfections in the exhaust manifold, even though it may not be easily possible to realize an actual gain, due to some method of creating a vacuum, in the absence of a condenser, which as yet has not been made to use in connection with the products of gasoline combustion.

It is not the purpose here to say that it will be feasible to condense the products of combustion, nor is it plain that there is much chance of gain by the introduction of an "air-pump" with the idea of axhausting the chamber to a point such as would result in a satisfactory vacuum. In the meantime, there is no good reason for using an exhaust manifold so designed that it will retard the passage of the products of combustion, nor can it be shown that any good will come from delaying the passage

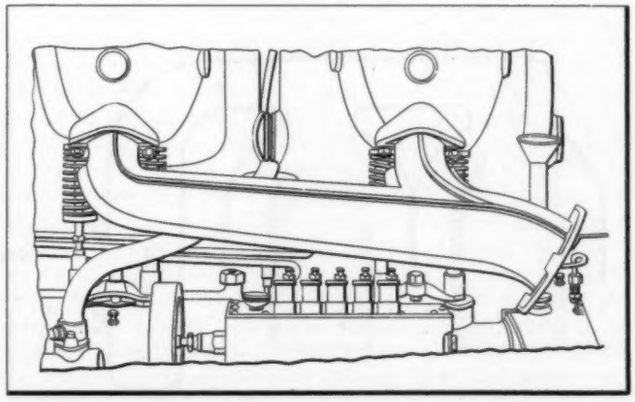


Fig. 52—Well designed exhaust manifold for a twin-cylinder motor of the four-cycle water-cooled type

of the exhaust to the atmosphere unless useful work is done.

In standard practice it is the idea to afford an easy passage for the exhaust, in a manner as shown in Fig. 51, which is an exhaust manifold as used on a two-cycle motor, with individual cylinders. As will be observed, this manifold is tapered down in such a way that the area is increasing as the needs, and it is also fashioned with easy bends at all points. Fig. 52 is a fine example of the same general plan, only in this case the manifold is placed on a motor of the twin-cylinder type; here, again, the area of the opening is increasing, so that there is no chance of "choking" the exhaust.

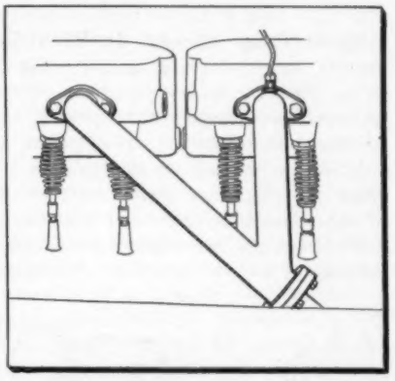


Fig. 54—Y-shaped exhaust manifold affording the advantage of saving bends in the exhaust pipe

In contrast with the designs already shown is the plan as depicted in Fig. 53, in conjunction with a two-cylinder motor (in this case) using flexible metallic tubing, the advantage of which lies in the perfectly uniform curves that can readily be made at the time of connecting up the exhaust; this same material is used with this motor on the intake as well. Against this material is the high first cost, which is compensated for by reduced cost of fitting, and finally there is the influence of the wrought interior to be given a fair measure of serious consideration. Whether or not the interior surface, as wrought as it is in flexible metallic tubing, will unduly retard the flow of the exhaust, is a matter that the author has not been able to determine, although he has used some of the tubing for this purpose, and found it to be very satisfactory. From the point of noise, it is believed that flexible metallic hose, so called, is quite free from this tendency, and it probably is true of it that it is a positive step in the direction of silent performance not counting its other advantages as ease in placing.

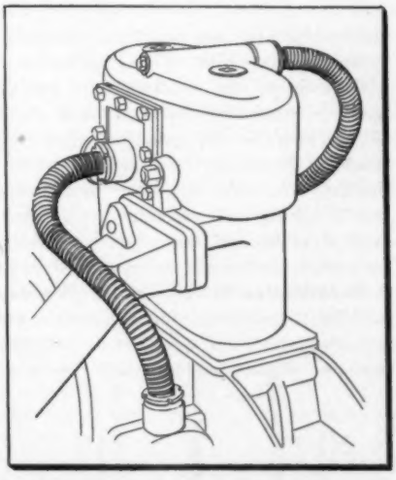


Fig. 53—Flexible metallic hose used for exhaust piping, affording a noiseless performance

Still another type of exhaust manifold is shown in Fig. 54, utilizing a "Y" form of branching, so contrived that the exhaust from the respective cylinders flows into the exhaust pipe proper at a point lower down than is usual in other forms, thus eliminating the bend that come in the exhaust pipe at a point near the motor. The same plan is illustrated in Fig. 55, on an air-cooled motor, and it possesses the advantage of tapping the heat away from the cylinders at the earliest possible moment.

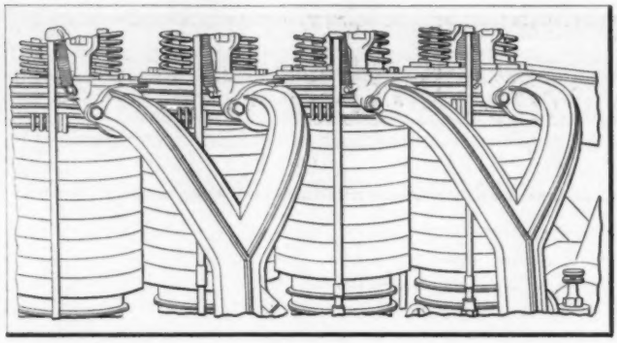


Fig. 55—Y-shaped exhaust manifold used on an air-cooled motor, employing two units and requiring abrupt ends at the pipe

Spark Plugs Should Be Well Clear of Manifolds—Frequently space is at a premium under the hood of a motor, and in the scramble to find room for everything, the parts are prone to interfere with each other. Fig. 56 shows the spark-plug rather too near the exhaust manifold, when it is placed on the exhaust side, which, in itself, is not an idea to be recommended. Even when the plugs are placed on the inlet side the same trouble is experienced betimes, and the disadvantages are by way of short-circuiting the high potential charge if the distance is infringing, and in any case it leaves but little room for the autoist to get at the plug with a wrench.

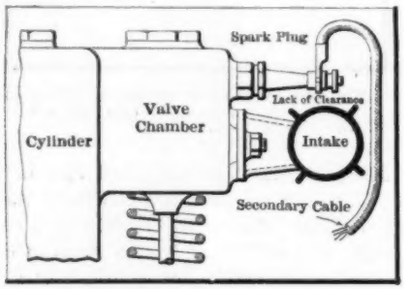


Fig. 56—Illustrating a wrong location of the spark-plug close to the manifold

If it is necessary to get at the spark-plugs with a wrench it is also desirable to be able to put on and remove the manifolds. If the studs are hid away under the manifold it becomes necessary to apply a chisel to them, and while it is possible to tighten the nuts by this method, it also has the disadvantage of destroying the heads in a very short while. Fig. 57 shows a manifold so designed that the heads of the holding bolts are accessible, and there is no good reason why this condition should not hold in all cases. Then, there is the question of the use of studs or bolts big enough to enable the manifold to be drawn up to make tight joints. The use of copper-faced asbestos gaskets is also well worth taking into account. As a rule, all these matters are well looked after, and there is no reason why they should not find universal application in automobile work.

Possibilities in Air-Cooled Work—Referring to Fig. 58, it will be to note that the exhaust is used to pull the cooling air into the jacket and over the heated cylinder surfaces; whether or not this plan is one that will find a wide use in future remains

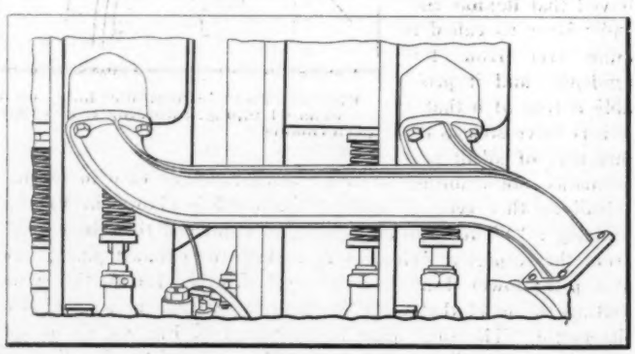


Fig. 57—Depicting a manifold in which the holding bolts are get-at-able, and of good practical size

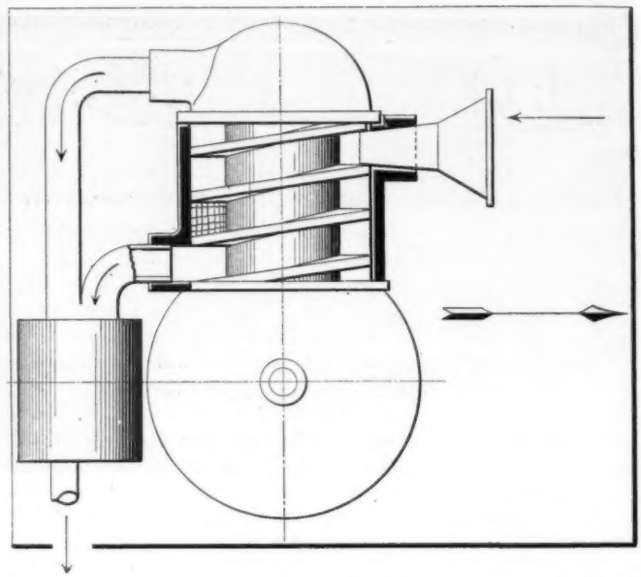


Fig. 58—The exhaust products of combustion are used to whisk the cooling air along

to be seen; yet, even so, it does look as if some use should be made of the energy that goes to waste in the exhaust. In this case the cooling air is passed around the surfaces of cylinders, and the exhaust products of combustion pass down to a point where the air and the exhaust join; the air is picked up by the exhaust and is whisked along with it and the amount of cooling

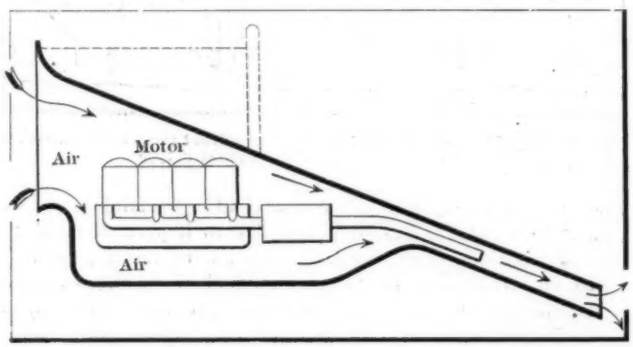


Fig. 59—Energy in the exhaust is used to sweep cooling air over all the motor surfaces

air that can be sucked in in this way should be adequate for the needs, which is in considerable contrast with Fig. 60.

Still another idea, differing from Fig. 58 more in detail than otherwise, is depicted in Fig. 59. In this case the exhaust goes to the muffler, which is located adjacent to the motor, and the cooling is drawn over the heated surfaces of the motor.

(To be continued.)

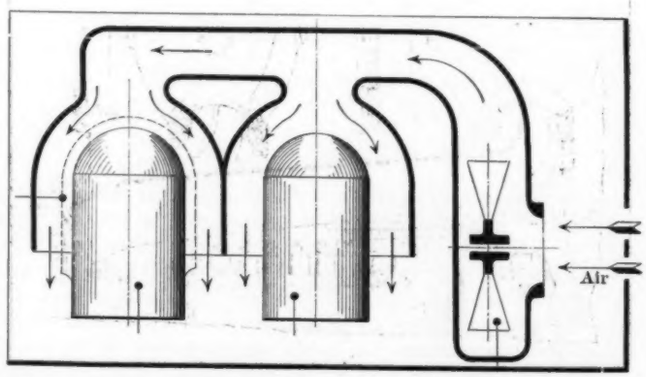
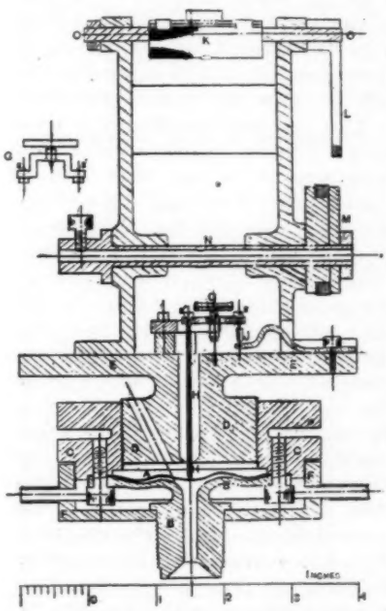


Fig. 60—Air-blast, through the use of a fan; may be adopted in conjunction with exhaust energy in the cooling process

Thermal and Combustion Efficiency of a Motor *

By Prof. W. Watson, D.Sc., F.R.S.

IN a paper read recently Professor Watson gave a large number of tables and diagrams which were the results and deduction from a very thorough test conducted by him on an automobile engine. To engineers and designers much of this matter is of more than passing interest, so that part of it is given below, space not allowing a full transcript, valuable as the matter may be, and doubtless is. The motor on which the tests have been made is a four-cylinder Clement-Talbot having a bore of 85 millimeters and a stroke of 120 millimeters. In order to vary the compression the cylinders were raised on carefully machined packing pieces, the thickness of which was varied for the different tests. As, however, this alone would only permit of the compression being lowered below that for which the engine was designed, rounded aluminum caps were attached to the tops of the pistons. These caps were made a good fit on the pistons, and were so designed that no narrow crevices were left in which the gas of the compressed charge could remain unburnt. The caps were all of the same volume and weight, namely, volume 42.5 cubic centimeters (2.6 cubic inches), and weight 155 grams (5¼ ounces).



Indicator Section Showing Construction

The exhaust from the motor is led through a pipe 9 feet long and 2 inches in diameter to two expansion boxes placed in series, the volume of each box being 1 cubic foot. When the engine is working at full power and at 1,000 revolutions per minute, the mean pressure in the exhaust pipe immediately after it leaves the engine is about 1.8 pounds per square inch.

The carbureter is a single jet one with a float feed, and for the tests it was altered so that the extra air inlet is closed quite air-tight, and a needle was fitted so that by means of a micrometer screw the point could be moved up from below into the orifice of the jet and hence the effective area of the jet could be altered. In this way it was possible to obtain mixtures of any desired richness. The closing of the extra air inlet, which normally is opened by a piston on which the suction of the engine acts, causes all the air supply, even at high speeds, to be drawn through the choke tube surrounding the jet. Although this may assist in thoroughly breaking up the jet of petrol and so help in producing a homogeneous mixture, yet on the whole it was at a disadvantage, and the wire-drawing obtained as the speed increased is due to this cause. The inlet manifold was altered to a straight pipe with openings to the cylinders, the carbureter being connected at midpoint. The size of manifold was increased until all cylinders received an equal charge.

*Paper read before the Institute of Automobile Engineers, London, Eng., recently.

Two Spark Plugs Used Simultaneously—Ignition was by high-tension magneto with two spark plugs in each cylinder, one over the exhaust and the other over the inlet. At high speeds more power was obtained by using both plugs; thus at 1,100 r.p.m. the indicated horsepower was 18.4 with a single plug, while using the two plugs it rose to 20.8, a gain of 13 per cent. At a speed of 1,600 revolutions the effect was even more marked, the indicated horsepower being raised from 26.0 to 29.2 by the additional spark. This is equal to 12.3 per cent. The effect is due to the quicker ignition obtained with the two sparks, a matter of greater and greater importance as the speed gets higher and particularly so on racing motors.

The petrol supply was so arranged that the engine could either be fed from a reservoir or from a graduated glass vessel, the change from one to the other being made by means of a three-way cock. The temperature of the petrol in the measuring vessel was noted by means of a delicate thermometer, a matter of considerable importance since the density of petrol varies so rapidly with temperature. Each test extended over the time the engine consumed 400 cubic centimeters of petrol.

The cooling water was taken from a 20-gallon tank and circulated by means of a centrifugal pump driven by the engine, being then returned to the tank. An overflow pipe was provided to the tank and cold water was supplied at such a rate that the temperature of the water as it entered the engine was between 55 degrees C. and 65 degrees C. If the temperature was allowed to rise much above 65 degrees the water started to boil and the engine to show signs of preignition.

The engine was direct coupled to a shaft mounted on ball bearings, and on this shaft were mounted three sets of fan blades. The load was varied by altering the number and size of the blades. This arrangement for taking up the load is convenient in that the speed during a test remains very constant, for the load varies as the cube of the speed. It has, however, the very great disadvantage that the load cannot be altered while the engine is running and further small adjustments in load, such as would be required to keep the speed constant when the richness of the mixture is altered, cannot in practice conveniently be made. For this reason in the test described below the speed during any one set could not be kept quite constant. This is a distinct fault and renders the interpretation of the results, particularly with very weak mixtures, a matter of a little uncertainty. In future experiments along the same lines as these, I hope to obtain a dynamo to take up the load, in which case it will be easy to so adjust the load that the speed is the same for all tests.

Speed-Indicating Devices—The engine speed, that is, the number of revolutions, was measured by a Weston speed indicator, a well-known device, but a check on this was obtained

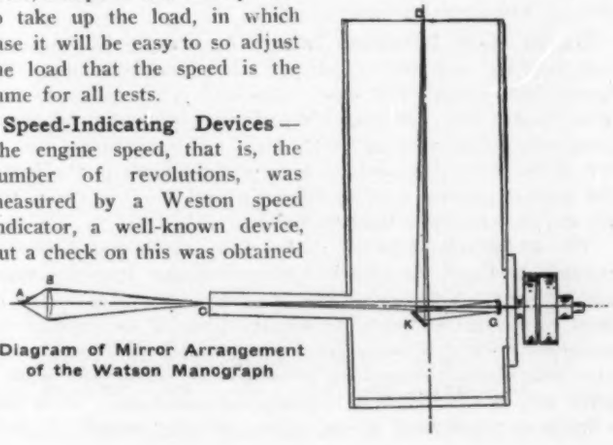
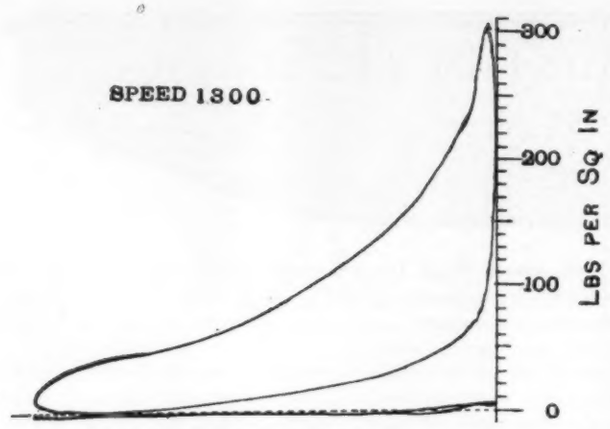


Diagram of Mirror Arrangement of the Watson Manograph



Typical Indicator Card Taken at a High Speed

by counting the revolutions per minute. The cards were taken by means of an indicator made by the writer and differing from both the Carpentier and Schultz instruments in the use of a corrugated diaphragm and two separate mirrors. The two mirrors are capable of rotation at right angles to one another, one being moved by the diaphragm and the other by the piston.

The internal construction is revealed by the first figure, while the second is a diagrammatic representation of the workings of the mirrors. The diaphragm A consists of a corrugated steel disc, .65 millimeter (.0256 inch) thick, the portion on which the piston acts being 44.5 millimeters (1.754 inches) diameter. As the success of the indicator depended upon these discs, they had to be made very carefully. The diaphragm is clamped between a steel cover B and a steel ring C. This ring is screwed to the gun-metal plug D, which is connected to the base plate E of the instrument by a narrow neck. In the first pattern of the instrument made, the diaphragm was clamped to the underside of the base plate E, but it was found that the readings obtained with an increasing pressure always differed slightly from those obtained with a decreasing pressure. After many weeks' work this effect was traced to a deformation of the base plate under the pressure and was entirely eliminated by the adoption of the present form. A box, F, screws on the back of the cover B and cold water is circulated in the space inclosed, serving to keep the temperature of the diaphragm at a very constant figure.

These indicators have been in use for more than a year and have been found to work satisfactorily and give a diagram 4 inches by 3.75 inches in which the pressure scale is uniform to within less than 1 per cent. This uniformity of the scale is of considerable importance when a large number of indicator diagrams have to be reduced, since owing to the shape of the diagram given by a petrol motor the author found it necessary to take at least 20 ordinates to obtain an accuracy of 1 per cent. A typical card taken at 1,300 r.p.m. is shown just as taken—that is, without retouching.

Use of Many Indicators Insures Accuracy—One indicator was used for each pair of cylinders, the connections being short steel tubes, which were water jacketed. Three series of tests were made with differing compression pressures, the change being effected by altering the thickness of the packing piece. In test A the piston occupied the high position, while in the B tests the highest position was 3 millimeters lower and in the C tests 8.6 millimeters lower than in the A tests.

The actual volume of the combustion space was measured by pouring in water, the cylinders being removed from the engine and inverted. A known volume of water was poured in and the level of the surface below the bottom flange of the cylinder was measured. Then allowing for the caps on the pistons, the volume which would have been present when the pistons were in place and in their highest position was calculated. Great difficulty was experienced in obtaining consistent results, it being very difficult to get rid of all air bubbles, and hence the results can hardly be depended upon to more than 1 or 2 per cent. The volume of the combustion space is very nearly the same in the case of each cylinder, as is shown by the following numbers:

Number of cylinder	1	2	3	4
Volume of combustion space (A tests)	183 cc.	184 cc.	180 cc.	188 cc.

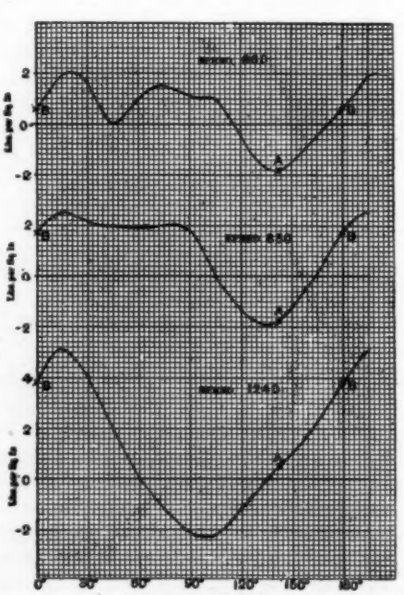
The equality in the volumes of the combustion spaces is also shown by the equality of the compression pressures as read off the indicator diagrams.

The average pressures for the four cylinders and in the three sets of tests are as follows:

Series.	A	B	C
Total volume at outer center	865 cc.	882 cc.	913 cc.
Volume at inner center	184 cc.	203 cc.	233 cc.
Compression ratio	4.71	4.35	3.92

Measurement of the Air Used by the Engine—The quantity of air taken by the engine at different speeds was measured by connecting the intake of the carbureter to a wooden box of 19 cubic feet capacity, the air being admitted to the box through a circular hole in a thin metal plate, and measuring the difference in pressure between the external air and the air in the box. The size of the hole was such that in every case the difference in pressure between the inside and outside was about equal to 1 inch of water. This pressure was measured by a King's gauge, the gauge being calibrated by comparisons with an oil manometer, a cathetometer microscrope being used to measure the length of the oil column. This gauge allowed the pressure to be read to within 0.002 inch of water. Leakage of air into the induction pipe, without passing through the measuring box, was reduced to a minimum by fitting stuffing boxes to the inlet valve stems and by packing the holes where the rod for moving the throttle passes through the induction pipe. To reduce the effects of the irregular aspiration of the engine a sheet of thin rubber was stretched over a hole 12 inches by 18 inches in the side of the box.

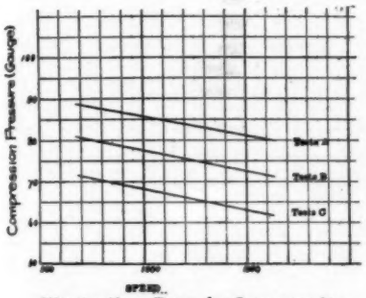
As the speed increases the quantity of air taken in decreases, this being worthy of investigation, as it will determine the size and proportion of the induction pipe and inlet valves of modern motors, which show a tendency toward higher speeds. The mean pressure in the inlet manifold was accurately measured, using a mercury manometer. The results when plotted show that the weight of air at any speed, say, 1,000 r.p.m., slopes down more than does the curve of mean pressure, which suggests the thought that the pressure of the air in the cylinder when the inlet valve closes falls more rapidly than does the mean pressure in the induction pipe. On the assumption that the latter is not equal to the mean another series of diagrams was made, these being shown. In them the point of inlet valve opening is at A, while the point at which the inlet closes is at B. The three diagrams show clearly what has never been shown before, namely, the drop in the inlet pipe pressure as soon as the inlet valve gets fairly open and also the continued rise in pressure when the valve has closed. The same effect is also noticed with the exhaust, the pipe pressure rising with the opening of the valve, the fall showing a very rapid drop due to gas inertia. The back pres-



Peculiar Curves in Exhaust Manifold

sure rises with increase in speed. At high speeds the induction stroke takes less time so the gases drawn in would have less time to acquire heat from the walls. At slow speed, on the other hand, liquid is without doubt drawn in which apparently reduces the total volume of cylinder charge.

Of interest to carbureter designers is the variation of the suction in the cycle. If the orifices through which the air is admitted to the carbureter are close to the jet the rise of pressure above atmospheric will not occur. If, however, as is often the case, air is drawn from near the exhaust pipe and is conveyed to the carbureter through a pipe of some length, then the rise of pressure due to inertia will be considerable. In the same way the manner in which the pressure in the exhaust pipe varies with the speed suggests that if it is desired to have a maximum power at a certain speed a little experimenting with exhaust pipes of different lengths will increase the power materially or give the desired result.



Illustrating Drop in Compression Pressure

If the thermal efficiency be plotted against the consumption of fuel in pounds per 1,000 r.p.m. it will be noticed that the efficiency increases as the mixture gets weaker up to very nearly the weakest mixture on which the engine will run regularly. In this connection it was observed that with mixtures containing between 17.5 and about 19 pounds of air to a pound of petrol, firing back into the carbureter was liable to occur, while with mixtures either richer or weaker this effect was not observed, the reason in one case being that the stronger mixtures burn so quickly that all flame is extinguished when the new charge enters, while in the case of the very weak mixtures the incoming charge is so weak that it will not inflame until it is compressed. The spark was in every case so adjusted that the maximum power was developed.

As a result of plotting all of these quantities it was found that at all speeds the efficiency is a maximum at an air to petrol ratio of about 17, while combustion would theoretically be complete at all ratios above 14.

High Efficiency Very Noticeable—One of the most noticeable things in the whole series of tests is the very high efficiency obtained, the maximum being .276. For one thing this establishes the fact that thermally the automobile engine is not only on a par with, but actually is superior to, all internal combustion engines excepting only the Diesel motor. The efficiencies were:

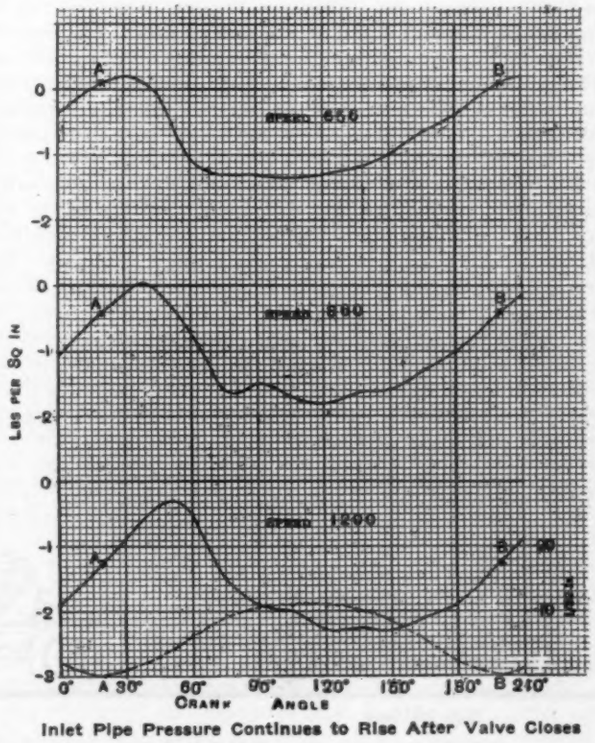
Test	Compression Ratio, Etc.	Air Standard Efficiency	Air/Petrol	Actual Efficiency	Relative Efficiency	Air/Petrol	Actual Efficiency	Relative Efficiency	Air/Petrol	Actual Efficiency	Relative Efficiency
A	4.71	.46	17	.28	.60	14	.25	.54	11	.20	.44
B	4.35	.44	17	.27	.61	14	.25	.56	11	.20	.44
C	3.92	.42	17	.26	.63	14	.24	.58	11	.19	.45

From the form of the combustion chamber in this engine the author had hardly expected to get so high an efficiency, for the surface exposed to the hot gases during the ignition (constant volume phase) is large compared to the volume. Thus a rough estimate of the surface area gives the values shown in the table below. That this ratio could be very materially reduced is shown by the numbers given for a combustion chamber having no valve pockets, a hemispherical top and a flat-topped piston. In such an engine the ratio of surface to volume of the combustion chamber would be only about half what it is in the actual engine. The reason the large surface exposed to the flame during the firing of the charge has not a more serious influence on the efficiency may be that the metal is coated with a layer of carbon; this layer being a bad conductor of heat, the surface actually exposed to the gas may be at a much higher temperature than would be the case with a clean metal surface, the other surface of the metal being water cooled. The presence of such a hot layer of badly conducting material would reduce the rate at which the hot gases lose heat to the walls of the combustion chamber. A similar argument does not apply to the portion of the cylinder traversed by the piston, since although there is a layer of oil, yet this layer is kept cool by the passage of the piston.

	Actual Engine.			Hemispherical Combustion Chamber.		
	A	B	C	A	B	C
Volume of combustion chamber.	184 cc.	203 cc.	233 cc.	184 cc.	203 cc.	233 cc.
Surface of combustion chamber..	370 cm²	378 cm²	393 cm²	181 cm²	190 cm²	205 cm²
Ratio of surface to volume	2.01	1.86	1.69	.99	.94	.88

Influence of Increased Compression—The result of increasing the compression does not have the effect that is generally supposed upon the mean effective pressure. By plotting the M.E.P. for the different mixtures three curves were obtained for the three tests, these being at three different compression pressures. In these curves it was shown that above a ratio of 14 any increase in the richness of the charge was not appreciable, while at that figure the M.E.P. only rises 2 pounds for a rise of 18 pounds compression—that is, at 68 pounds compression the M.E.P. was 83, while at 86 compression pressure the M.E.P. was but 85.

As the result of a close investigation into the composition of the exhaust gases and their relation to the power and speed, together with the theoretical composition of the exhaust, the author concludes that it is not safe to deduce the composition of the mixture supplied to a petrol engine from the results of the analysis of the gases made in the ordinary manner and on the supposition that the carbon all burns to CO_2, CO and CH_4, while the hydrogen is all present as water, CH_4 and free H. By means of the curves he does, however, think that the proportion of air to petrol can be deduced with sufficient accuracy for all practical purposes, and he hopes that the results will be of service to those who have to test carbureters and engines, as in many cases it is more convenient to analyze the exhaust gases than to measure the air and petrol.



Inlet Pipe Pressure Continues to Rise After Valve Closes

EFFECT OF SPEED ON TIRE PRESSURES

By Charles B. Hayward

DESPITE S. F. Edge's carefully carried out experiments on Brooklands last year, designed to prove conclusively that the prevailing practice of inflating tires according to a schedule of pressures worked out by the tiremakers wasn't of exceptional value, no one appears to have seriously accepted his findings that half inflated tires were quite the thing, either for the welfare of the pneumatic or that of the car. At least, few autoists are seen driving their cars around on half-pumped tires, except those who would be doing it anyway: the fellow who doesn't know as yet and is just buying his experience, and the lazy chauffeur, who is helping speed the bosse's coin to the garagekeeper. Whether his own countrymen and fellow Britons take Selwyn F. at par value and regard his as an oracle in things motoring is a question that must be left to them to answer. He is with them, buf not of them, for a more unbritish Britisher would be hard to find, at least where publicity methods are concerned. Somewhere back in his ancestry Edge must have had an American press agent, or a circus advance man, and S. F. is the result of an atavism. It seems difficult to explain his ability for keeping himself and his product so constantly in the limelight on any other ground. Whenever a "stunt" is pulled off in the autoing circles of the "Tight Little Isle," Edge is written large all over it, and the more unusual and extraordinary it is the more likely it is apt to be Edge. He crops up periodically in unexpected roles, and this tire business was one of them.

But, seriously, there is more in it than appears on the surface, and a little study of causes and effects throws considerable light on something that has been more or less puzzling to racing drivers ever since automobile speeds on the road got well above the mile a minute mark. Edge's experiments were designed to show that at high speeds and on a smooth surface it was possible to drive a car with partially deflated tires, not only without injuring the latter, but to their benefit, where the matter of endurance was concerned. Just how this worked out, or whether it actually did result that way outside of the published reports, is not the purpose of the present article to explain. As the result of his experiments Edge placed himself on record as advocating tire pressures considerably less than those recommended by the manufacturers and by automobile designers, on the ground that both easier riding and greater mileages would be obtainable. No experienced autoist has ever had any reason to doubt the former of these findings, but as already mentioned, few in this country, at least, appear to have given the latter the benefit of the doubt to the extent of trying it. Sustained high speed on a smooth and specially prepared surface, such as that of the Brooklands track, and the average touring speed over give-and-take roads present conditions that it is somewhat difficult to reconcile or draw any parallel between, so that in advocating the adoption of this expedient as a means of increasing tire mileages under everyday service conditions, Mr. Edge appears to have drawn somewhat more liberally on the press agent's license than is usual with him.

Whether this be the case or not, is beside the question. No attempt seems to have been made to explain why it was possible to drive a car at high speed with partially deflated tires, when all authorities so urgently recommend maintaining the pneumatics at a certain pressure, proportioned to the weight they are designed to carry, for ordinary speeds. For that matter, regardless of the speed, and the natural inference would appear to be that the faster the car was to be driven the more need there would be of properly inflating the tires. In fact, the adoption of a schedule of standard sizes of tires for certain weights and the pressures to which they should be inflated to properly carry such loads was the first great step in advance made by the tire industry, and regarded in the aggregate probably did more to lessen trouble with the pneumatic than any other single factor. So much for the need for pressure. The reason, or at least what may be accepted as such, for attempting to undermine what has already ripened into the well established custom of regarding no tire as safe that is not pumped to a good pressure has been pointed out.

Racing Drivers Seldom Aware of Punctures—It is a matter of common knowledge to the racing driver that a puncture is seldom, if ever, felt at the moment it occurs when driving at high speed on the straightaway. When the writer interviewed Hemery, winner of the 1905 Vanderbilt on the Long Island course, shortly after the race, he said he was not aware of the puncture that came so near costing him first place, as was the case with Robertson driving the Locomobile in last year's event, and did not discover it until the lateral weakness of the tire mare itself apparent upon rounding a curve, although the original accident must have taken place two or three miles before reaching that point. Doubtless other racing drivers can recall similar instances. The best road course ever laid out is far from being related to the proverbial billiard table, and the speeds of considerably better than a mile a minute—close to 90 miles an hour, in fact—that were attained on the straightaway stretches, magnify an almost invisible ridge or depression across the road into a thank-you-marm of the most virulent Pennsylvania type. What prevents a punctured tire from collapsing under this terrific pounding?

Centrifugal force appears to supply an answer. It is a well established principle that a body acting under the influence of centrifugal force tends to leave the source of that force at a tangent and to progress in a straight line. The average road supplies an unending series of tangents, along which the car flying at high speed tends to travel, and would follow were it not that the superior attraction of gravity makes it adhere to the actual contour of the road surface. The wheels, turning at high speed, supply sources of centrifugal force at four points and the terrific inertia of the swiftly moving ton of metal tends to overcome the attraction of gravity, and the machine bridges gaps which at lower speed would be followed in outline. This

50 Miles 75 Miles 95 Miles

Dotted Line Shows the Tangent to Surface of the Earth Which the Cars Tend to Follow at Various Rates of Speed

is what is expressed in the vernacular by "hitting the high spots."

As the Speed Increases—It will be evident that as the speed increases these forces do likewise. Whether in direct proportion or in far greater ratio is difficult to determine offhand. In other words, when the car travels faster and faster, as in being "let out" on a straight stretch, it tends to describe what an artillerist would term a rising trajectory. The only thing that prevents this being visible to the unaided eye on an ordinary piece of road is the fact that gravity is still strong enough to keep the car on the ground, and fortunately, speeds have not yet attained a point where this universal force is overcome altogether. Otherwise, some raving drivers might have anticipated the achievements of the Wright brothers unintentionally long before they were ready to give their secret to the world. But where conditions are unusually favorable, such as those supplied by the numerous "dip-of-death" bridges spanning the roads that intersect the Long Island Motor Parkway, the effect is no longer invisible, and due to their terrific inertia the racing cars actually do describe a rising trajectory when leaving the upgrade face of the stretches leading to these bridges. This was strikingly shown by the photograph of Robertson's Locomobile, with all four wheels above the ground, that was taken during the last Vanderbilt race, and which is reproduced herewith.

It has already been pointed out that as the inertia and centrifugal force developed by the moving car increase, the attraction of gravity is overcome to a constantly greater extent. This is equivalent to stating that at 70 miles an hour a racing car weighs far less than when running more slowly, or when standing idle. Actually, there has been no change to bring such a magic transformation about, otherwise entrants might be desirous of having their machines weighed as they passed over scales located in the center of smooth five-mile straightaway, where they could do their best. But in so far as the weight bearing on the tires is concerned, it is true. Therein lies the explanation of the possibility of running at high speeds on a punctured tire without the driver or his mechanic being aware of the fact that one of the rubbers has suffered. In a four-inch pneumatic, for instance, a pressure of approximately 80 pounds to the square inch is requisite to support the load represented by a car designed to carry tire equipment of that size, without permitting the walls of the shoe to bend unduly—a privilege that comes high. Taking the weight of the car at 2,200 pounds and that of the driver and his mechanic at an additional 300, it will be evident that when standing idle each wheel is bearing 625 pounds weight, distributed over a relatively small surface—that of the point of contact with the road—the external pressure per square inch is very high.

Under Ordinary and High Speed Conditions—When a tire punctures under ordinary conditions, the sum of these pressures is combined to force the air out through the opening thus made. But a similar accident at high speed is not attended by immediate results of the same nature. To a very great degree—dependent upon the rate of speed, of course—the tire is relieved of the tremendous external pressure it would otherwise have to bear, and while its internal pressure is more than sufficient to insure the hasty exit of the air, the tire does not collapse for the reason just given. In other words, the car's speed makes it self-supporting to such an extent that on straight stretches it continues to travel upon a pressureless tire almost as if nothing had occurred, and Mr. Edge's experiments demonstrated that this was true in such measure that it was possible to drive a car at high speed on four tires inflated to far below their normal pressure. So much for that part of the theory. It is a valueless one, so far as any real benefit to be derived from it is concerned.

However, an attempt has been made to show graphically just how it works out. This will be seen in the accompanying sketches. Taking the stretch of level road as representing the circumference of a circle of infinite radius, the dotted line is intended to depict the lifting effect of the combined forces generated by the speed of the car, as well as the tangent that it would tend to follow were its flight sufficiently fast to entirely nullify the attraction of gravity. Naturally, the degree to which this holds true must be assumed, though it seems quite probable that at from 75 to 95 miles per hour, the external pressure, or actual weight carried by the tires, is so far reduced as to become an almost negligible factor. No other deduction seems possible in view of the results of the experiments mentioned, when regarded in the light of the experience of racing drivers to the same effect. The rate of speed at which this assumes sufficient importance is also a matter for conjecture, though it seems quite probable that the effect in question would be almost wholly lacking at less than 50 miles an hour. The rising trajectory has been plotted with these rates of speed as checking points.

Reproduction of Trajectory Described by Robertson's Locomobile in the Last Vanderbilt Race

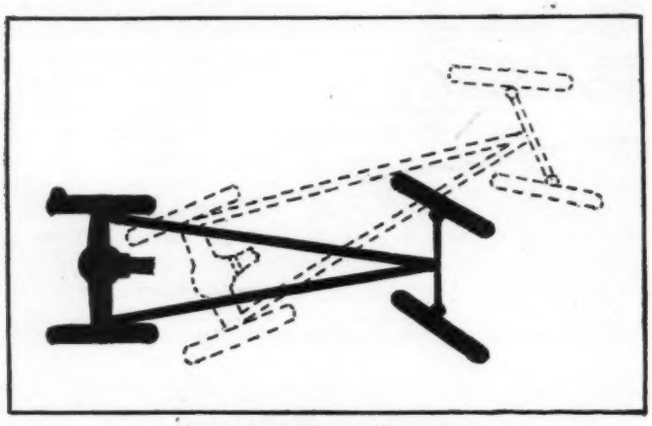
The second sketch is intended to outline the trajectory followed by a racing machine crossing one of the Long Island Motor Parkway bridges at high speed, and is naturally exaggerated for the purposes of illustrating, though in reality it is not overdrawn to any great degree. How true this is may be judged of from the photograph depicting the actual occurrence. It will be evident from a study of the sketch that the conditions are usually favorable for obtaining this effect owing to the abrupt end of the grade and the corresponding drop on the other side, but a little study will show that this is but a reproduction of usual road conditions on a vastly enlarged scale, and the bodily departure of the machine from the ground is but a longer flight of the same nature that a car traveling at a great velocity is continually taking when it "only hits the high spots." The ease with which a car steers at high speed may also be regarded as evidence of the decreased pressure on the wheels of the weight of the car.

It may be thought at first sight that a flight such as that which the camera caught Robertson's Locomobile in the act of making in the last Vanderbilt, could only be possible under the unusually favorable conditions of road contour that there existed. But that this is the usual, rather than an extraordinary effect, to be expected under conditions at all similar, was shown by a photograph of Haupt's six-cylinder Chadwick leaving the ground at the top of Giant's Despair in the hill-climb a year ago. All four wheels of the car were in the air, but the effect was naturally not quite as striking, as a level stretch followed the brow of the hill and the speed attainable up such a grade could not be compared with that made on a cement straightaway.

Aids in the Driving of a Car — Part 4.

By D. R. Hobart

THREE things are to be remembered with regard to side slipping and skidding. First, either the front or rear wheels are liable to slip sideways if the driver attempts to alter the direction of travel suddenly on a greasy road. Second, rear or driving wheels when driving are more likely to lose their grip on the road than those which are rolling freely. Lastly, a spinning wheel or one which is locked loses its individual direction of travel and becomes simply a point of contact on the road. From this it will be seen that side slip is usually experienced with the rear wheels and depends on the application of the brakes, and the care in driving and that it need not necessarily result from taking a turn too rapidly or too sharply. This can be shown by driving a car along a greasy road and applying the brakes with sufficient force to lock the rear wheels. The car



Illustrating a Front Wheel Slip

will immediately tend to turn end-for-end upon the road and even if the road is not greasy a sort of side slipping is set up, which can be corrected by the steering gear, in causing the front of the car to move sideways in unison with or to a greater extent than the rear wheels. If the rear tires cannot obtain any grip on the road, as they are being dragged over its surface the rear of the car is apt to swing around too quickly for the driver to check such a tendency in the brief time available. Side slips of this character can only be checked by either releasing the brakes and thus freeing the wheels or by causing the front wheels to keep the car parallel with the road as soon as the first signs of slip become apparent, since once the rear of the car has swung around to any extent the driver is powerless to bring it in position again by the manipulation of the steering gear. The wheels need not be actually locked in order to bring this about; all that is needed is for them to lose their grip on the road and this occurs when they revolve at a slower peripheral speed than that of the car or when driven at a higher speed than that at which the car is moving. Skidding usually occurs to cars which have front wheel brakes or to other cars when the driver is successfully continuing to counteract the accompanying tendencies to side slip.

Front-Wheel Slips Infrequently Encountered.—Front-wheel slips due to deviation of the car from a straight course or to excessive camber of the road are not often encountered even though the front wheels are usually fitted with smoother tires than the rear wheels. Such slips when they do occur are most unpleasant, as the autoist has no control whatsoever over the car while they last. Generally speaking, a front-wheel slip occurs when a fairly sharp turn is being made on a road covered with greasy mud or when the road falls away steeply to the drains at the side. Judicious application of the brakes will often have the effect of straightening up the car as well as of retarding it, if there is sufficient room at the side of the road to which the slip is occurring, but the best way to check the slip is to bring the front wheels well around in the direction that is desired to be taken. By doing this, the front wheels tend to reduce the speed of the car and to squeeze the mud away from in front of them. The autoist must be on the alert to straighten them up immediately they obtain a hold on the road, as otherwise the car will move toward the other side of the road with startling rapidity. The sketch shows a typical front-wheel slip.

Slips Due to Acceleration or Retardation of the Wheels—Rear-wheel slips due to acceleration or retardation of those wheels should be checked similarly to slips resulting from sudden alteration of the direction of travel. The differential gear on the car is likely to aggravate slips of this nature as the wheel which has the least adhesion to the road, by spinning forward at double speed, can relieve the whole of the drive from the other wheel and the car will slew around on the stationary wheel as a pivot. A brake on the transmission between the motor and the differential gear will cause the wheel that grips the least to spin backwards under the driving influence of the other wheel, and a similar slewing action is set up. The autoist should remember that both rear wheels must be on firm ground before the brakes or accelerator can be operated to overcome the slip. Imperfectly balanced hub brakes are a fruitful source of side slip of this nature as one wheel is called on to do the greater part of the braking and one locked wheel is pretty sure to throw the rear part of the car around sideways.

Slips on Ascending and Descending Hills—Of frequent occurrence in general driving is the descent of steep and slippery hills. Obviously, the brakes must be used in order to keep the car under control, but the autoist often finds that their application causes the rear of the car to swing right around, particularly if one hub-brake has a better grip than the other. With smooth tires, that is, tires without studded treads or unequipped with chains, the situation is hazardous despite all anything the autoist may do, but in all cases such hills should be approached at a walking pace and the car prevented from increasing its speed by judicious use of the brakes the whole way down. A typical slip of this type is shown in the sketch, the dotted lines indicating the position often assumed by the car at the completion of the slip. Equally awkward is the ascent of a hill thickly coated with mud or ice. In such case, once the wheels commence slipping the car may tend to spin in a circle and to slip backwards while so doing to the bottom of the hill. If the hill is extraordinarily steep and greasy, several circles may be described if the car is small or has excessive clearance and the autoist will not have the slightest control over the car during the evolutions. In climbing ordinary hills that are greasy, a moderate speed should be maintained from bottom to top, avoiding any sudden acceleration of the road wheels, and momentarily easing off the drive to enable them to regain their hold at the first signs of excessive spinning. The ability to drive at a constant speed is invaluable to the autoist in cases like this. Where ascents or descents are hazardous, rope wound around the tire and felloe

is of the greatest assistance. Gunny sacking, lap robes or even newspapers laid on the road are excellent when the tires are unable to obtain any adhesion.

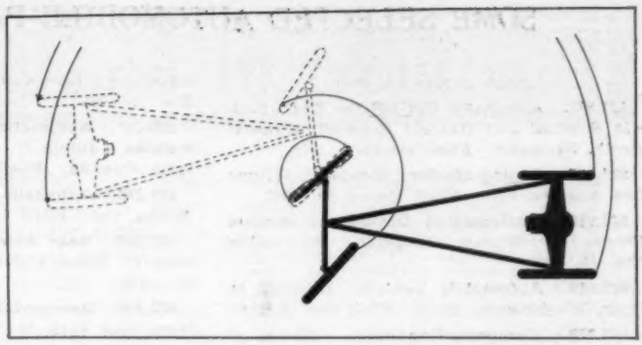
Typical Instance of Skidding—Skidding occasionally occurs when the autoist is endeavoring to bring the car to a stop within a limited space. On wet or slippery and even on dry roads at times it is difficult to pull up quickly if another vehicle has suddenly stopped a short distance ahead of the car. Setting the brakes introduces side slip at the rear, and while this tendency can be checked by means of the steering gear the forward skid will continue in many cases. The fault is, of course, on the part of the autoist in having approached the other vehicle at too great a speed consistent with the state of the road and with regard to the efficiency of his brakes. To obtain the maximum retarding effect under such circumstances, the brakes should be applied and released alternately with a quick vibratory motion of the foot, a powerful braking influence being thus brought to bear on the wheels, and the intermittent periods when they are free to roll enabling them to maintain their grip on the road.

Experience Teaches Suitability of Tires to Road Surfaces—As the autoist encounters various kinds of roads when driving he soon learns to know those that are slippery when wet or muddy and how any road should be negotiated with either smooth or non-skid tires. Where the road is greasy, smooth tires can obtain but little hold, whereas studded or non-skid tires are usually capable of reaching bottom through the coating or film and gripping the road. On the other hand, new non-skids will slip badly on Belgian block or other hard-surfaced roads while smooth tires will adhere nicely thereto. The same distinction may be drawn between smooth and studded or non-skid tires as between rubber-soled shoes and heavily-nailed boots in regard to certainty of locomotion.

Slow Traveling the Best Remedy—Whenever the road is inclined to be treacherous, slow traveling is the best remedy against side slips and skids. The autoist should avoid using the brakes at all if possible and this he can do only by concentrating his attention on the road at a much greater distance ahead, as regards speed, than is his usual custom. If a turn is to be made, or if the brakes have to be used he should take advantage of dry spots or any camber favorable to his purpose, as it is frequently possible to choose to some extent the exact course that is taken. For example, if a pull up or considerable reduction of speed will be necessary within the next few minutes, a lookout should be kept for less slippery spots which may be of service or at the least choose a portion of the road where the conditions are no worse than that over which the car is progressing at the time. The same thing should be done if a turn of any nature has to be made under the same circumstances. The risks of side slip can thus be reduced if not altogether eliminated. Various other methods of preventing side slips are used by autoists, depending on the circumstances, and these are the result of experience and in some cases suited only to certain cars.

Stopping for Any Cause—When stopping for any cause the autoist should bring the car over to one side of the road so that it will be out of the way of other traffic. In doing this a position should be taken up so that when the car is started again there will be no difficulty in getting under weigh. In bringing the car to the roadside, as in the sketch at A, the autoist not only allows others the use of the road but protects himself from being run into or hindered while making repairs, etc. On the other hand, autoists who are otherwise considerate sometimes remain in or near the center of the road as at B, if the stop is an involuntary one, and commence repairs, hindering others from passing and running the risk of being hit by other cars. The excuse usually given in such cases is that they did not know that the road was much traveled over, and thought that the center of the road was as good a place as any to stop.

Plenty of Space Should Be Allowed When Pulling Up—One of the mistakes committed by inexperienced, and indeed, quite a number of experienced autoists is in not allowing sufficient space on all sides when pulling up. It is a common occurrence to see the driver of a car backing and going ahead inches

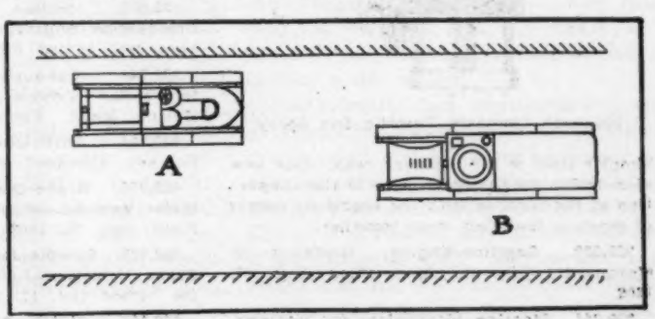


Typical Slip When Descending a Slippery Hill.

at a time in the endeavor to get clear of the curb which he has approached too closely. Occasionally also an autoist is seen who has driven up too closely to another car and left no room to get at the starting crank after the car has been pulled up and the motor stopped. The remedy is obvious; allow plenty of room in all cases. The car can be brought up to the curb and stopped with the front wheels turned slightly to the left, and the off rear wheel about a foot away from it. From this position there will be no difficulty in starting off when it is desired to do so.

Forethought When Making Repairs on the Road—It is obvious from what has been said in regard to stopping, that corners and narrow roads are not the safest places to conduct repairs in. Neither should a tonneau door be allowed to remain open nor tools be scattered over the road. A good habit to follow with regard to tools is to place those needed for the particular work on the running board, and as each has been used to return it thereto. In all cases the autoist should place the change gear lever in the neutral position and set the hand brake before leaving the seat. Accidents caused by the car running down the driver when cranking will thus be prevented. If the car is to be pulled up on a comparatively steep hill, it would be well to bring the front wheels around sharply and allow the off wheel to rest against the curb or bank at the side of the road.

Coast as Often as Possible—Coasting should be indulged in whenever the nature of the country and the amount of traffic on the road will allow it to be done with safety. Not only does coasting tend to economy in fuel but it allows the motor to rest, particularly if the latter has been working hard in climbing hills or running over heavy roads. When about to coast the motor should be declutched, the gear lever put in the neutral position and the motor slowed down to its slowest speed. If the hill is a long one, the motor may be stopped entirely, thus stopping the consumption of fuel and the wear and tear on the motor and allowing the latter to cool off. With sliding gears, the high-speed position can be used instead of the neutral whether the motor is running during the coast or not. At the top of a long hill the switch may be thrown off after declutching, but before the end of the hill is attained the ignition should be switched on and the clutch let in gently, starting the motor by the momentum of the vehicle. The autoist should always employ the highest gear when starting in this manner as the stresses imposed on the mechanism through using a lower gear would be too severe, and might result in a bad breakdown.



Proper and Improper Positions When Pulling Up

SOME SELECTED AUTOMOBILE PATENTS

Issue of May 18, 1909

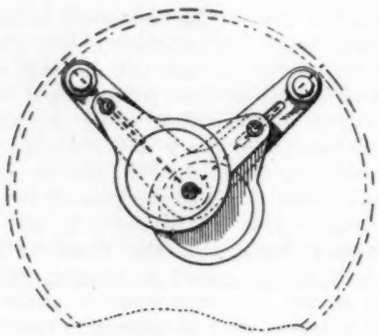
921,897. Automatic Cut-Off for Gas. Ludwig Schmidt and Herbert Schmidt, Kaiserswerth, Germany. Filed March 6, 1909.

921,933. Engine-Starter. Daniel C. Wilgus, Los Angeles, Cal. Filed March 29, 1907.

921,936. Antiskidding Device for Wheels. Robert M. Winsch, Lansdale, Pa. Filed Feb. 15, 1909.

921,963. Automobile Vehicle. Leonard H. Dyer, Washington, D. C. Filed Feb. 3, 1900.

921,978. Compensating Gear. Edwin J. Gould, Boulder, Col. Filed April 13, 1908.



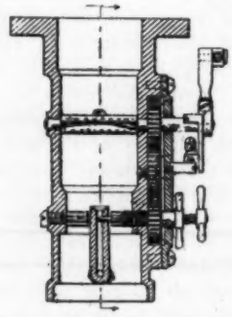
Gould Differential Substitute

The Gould substitute for a differential, shown herewith, was the subject of a spirited discussion in the technical press about a year ago, or, to be exact, as soon as Gould published an account of his device, which he did as soon as he had applied for the patent. The discussion developed the principles of the gear, which were thrashed out very thoroughly. As to its actual use, only time can show what it will do. The idea is a move in the right direction, for it replaces a complicated and expensive piece of mechanism, with a simple, cheap, and, as the inventor claims, a superior device.

921,994. Variable-Speed and Reversible Gear. George P. Innes and Thomas Con Allen, Sydney, New South Wales, Australia. Filed May 18, 1908.

922,145. Carbureter. Albert Howarth, Providence, R. I. Filed May 31, 1907.

Howarth, too, is working for simplification, his carbureter being without the usual float chamber, and the spraying nozzle being much



Howarth Connects Throttle and Spray

simpler than is the ordinary case. One new idea which he has worked in is the connection of the throttle with the nozzle by means of gears so that they work together.

922,009. Gasoline-Engine. Gustavus H. Marquardt, Cassville, Mo. Filed Aug. 27, 1908.

922,044. Steering Mechanism for Vehicles. Albert F. Rockwell, Bristol, Conn. Filed Nov. 3, 1905.

922,057. Automatic Swivel-Lamp for Automobiles. Julius O. Spang, Haileybury, Ontario, Canada. Filed Dec. 17, 1908.

922,278. Automobile-Wheel. Ole A. Hamre, Arriba, Col. Filed July 26, 1907.

922,308. Rear Axle for Automobiles. Frederick C. Miller, Cincinnati, Ohio. Filed July 16, 1908.

922,402. Demountable Rim-Tire. Alexander Dow, New York, N. Y. Filed Dec. 30, 1908.

922,403. Locking Device for Demountable Tire-Rims. Alexander Dow, New York, N. Y. Filed Jan. 29, 1909.

922,404. Demountable Tire-Rim. Alexander Dow, New York, N. Y. Filed Jan. 29, 1909.

Issue of May 25, 1909

922,454. Vehicle Spring. Lewis C. Burnet, Newark, N. J. Filed Sept. 11, 1908.

Burnet's compound spring is well known to readers of this paper, particularly those who read the advertisement pages. In this, as the patent drawing shows, there are two full elliptic type springs superposed, one being directly above the other. The upper one is fastened to the automobile frame in the ordinary manner, while the lower follows usual practice in its attachment to the axle.

Burnet's Compound Spring

922,489. Motive Power for Automobiles.—Edward S. Lea, Trenton, N. J. Filed Nov. 9, 1907.

922,528. Cut-out Attachment for Internal-combustion Engines.—Benjamin F. Sheibley and Wilhelm Moller, Lewiston, Pa. Filed April 25, 1908.

922,563. Muffler Cut-Out Mechanism.—Lee S. Chadwick, Pottstown, Pa. Filed. March 8, 1909.

922,599. Reversible Transmission-Gearing.—Moses W. Kouns, Columbus, O. Filed May 4, 1908.

922,613. Internal-Combustion Engine.—Charles D. McClintock, Oakland, Cal. Filed June 23, 1908.

922,631. Pneumatic Tire.—Frank Reddaway, Pendleton, Manchester, England. Filed Feb. 18, 1908.

922,658. Spring-Wheel.—Elias B. Anderson, Rock Falls, Ill. Filed June 25, 1908.

922,669. Spare-Tire Cover.—Hyman Cohen, Brooklyn, N. Y. Filed Dec. 21, 1908.

922,673. Ignition System for Internal-Combustion Engines.—Mark B. Crist, Pittsburg, Pa. Filed Feb. 15, 1906.

922,741. Exhaust-Dissipating Apparatus for Motor Vehicles.—George E. Whitney, Boston, Mass. Filed Dec. 1, 1899.

922,964. Antifriction-Bearing.—Joseph E. Downer, Allenport, Pa. Filed May 29, 1908.

922,916. Brake-Operating Mechanism for Motor-Vehicles.—Paul Krause, Babylon, N. Y. Filed Aug. 26, 1908.

922,939. Spindle-Joint for Automobiles and Other Vehicles.—John A. Myers, Braddock, Pa. Filed Oct. 17, 1908.

922,965. Clutch Gear for Hubs of Vehicles.—Bernhard Settergren, Chicago, Ill. Filed June 6, 1906.

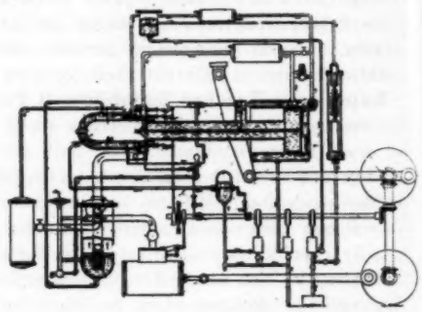
922,987. Electric Igniter for Explosive Engines.—Emil Westman, Minneapolis, Minn. Filed Oct. 5, 1907.

923,044. Gear-Transmission Mechanism for Automobiles.—Edward J. Gulick, Mishawaka, Ind. Filed Aug. 15, 1907.

923,045. Torsion Tube-Support for Rear Axle Housings of Automobiles.—Edward J. Gulick, Mishawaka, Ind. Filed Sept. 13, 1907.

922,509. Compound Explosive Engine. Sidney A. Reeve, Worcester, Mass. Filed June 18, 1906.

There have been a number of attempts to produce a slow burning rather than an explosive engine, along the lines of Brayton,

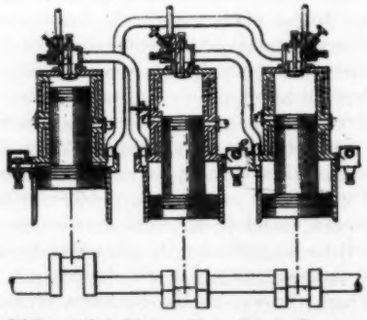


Reeve Compound Explosive Engine

the great American pioneer. Of those interested in the subject, Professor Reeve is prominent, and the patent specification and drawing show the outlines of his proposed system. In the drawing too many parts are perhaps included, so that the main issue is rather beclouded, but the idea is there, at last put into working form. The Brayton, and consequently the Reeve, come in what is called the first class. This is the type of gas engine igniting at constant volume but without previous compression, and represents, in principle at least, the simplest and most apparent method of obtaining power from gas.

922,911. Internal-Combustion Engine.—Thomas D. Kelly, Essex, England. Filed Nov. 8, 1907.

In the van of the parts which are now receiving the attention of inventors, engineers



Differential Piston Two-Cycle Engine

and designers, is found the engine, and prominent in these are the attempts to improve over the two-cycle form. Kelly has used the differential piston type, and uses the three-cylinder form. The first cylinder, at the lower diameter compresses the charge for the upper or explosive part of the piston in cylinder number two, the lower part of which performs a like function for number three. The latter, in turn, compresses the gaseous mixture for the first. The most apparent objection is the extremely large compression space necessary.

Letters Interesting and Instructive

FRICTION DRIVING

Editor THE AUTOMOBILE:

[1,905]—Please inform me through the columns of your paper if a friction-driven car is considered just as strong a car going up the hills as a direct-drive rear axle. Would also ask you to furnish the names of manufacturers who can supply parts for this type car, that is, the friction drives. W. H. S.
New York, N. Y.

It is generally considered that the efficiency of chains is superior to that of bevel gears, so that chain-driving presents advantages over the shaft drive. Yet the majority of cars are shaft driven. From this it is evident that other considerations than the mechanical efficiency govern the use of any device. So it is with the friction drive, good as it may be, the American people did not take to it, and as a result there are not many cars built using this form of drive. In some ways it is logical, for do not all cars ultimately drive by means of the frictional contact between the wheels and the road surface? Also, in the case in which a clutch is used, is not this a matter of frictional surface transmitting power.

Yet, in the face of all this reason, the form is not popular and the number of cars produced is small.

As to the firms making parts for such cars, at the present moment but one is recalled, the High Wheel Auto Parts Company, Muncie, Ind.

FRONT DRIVE ADVANTAGES

Editor THE AUTOMOBILE:

[1,906]—Will you please give me some idea of the reasons for the use of the front wheels for driving a car? Does not this complicate the mechanism of the car as a whole? Could you give a list of cars which are now made with this form of drive and the addresses of their makers? G. K. O'HARA.
Chillicothe, O.

There are a number of reasons advanced for this construction, chief among which are: absence of side slip usually spoken of as skidding; shorter turning radius, due to increased angle of steering lock permitted by this form of construction; pulling the car rather than pushing it is more rational and is said to be more efficient; concentration of parts in one position, and that an accessible one, allows of minimizing trouble, and thus locating it more easily; the concentrated construction allows of a number of minor economies which, on a large scale, might develop the whole into a lower-priced form.

Some of these reasons for the front drive are worthy of more than passing mention, thus the entire absence of skidding, if it could be proven, would more than offset the mechanical complications incident to driving and steering through the same wheels. The exact proportion of automobile accidents due to side slipping probably will never be known, but if it were known it would be very large. In the crowded streets of the larger cities the problem of turning around is a large one, for narrow streets will not allow of several successive backing up operations necessary in the turning of a large car. Then, too, the backing-up process requires a reverse speed, which under favorable conditions could be eliminated with a very short turning radius. This latter simplification would reduce cost, weight, make the control simpler and easier to understand, and through the medium of lesser weight would reduce operating expense.

The pull versus push proposition is one of theory, and the efficiency, or lack of it, innate in either form has never been proven, at least conclusively. As a matter of pure reasoning, however, it sounds well.

The last mentioned reason carries the most weight, for incident to the concentration of parts into a small compass is the possibility of uniting them into a single unit, which has been given the name of a "fore-carriage." This would be removable as a unit, and therefore would allow of its instant removal and the equally quick substitution of another. In any public service passenger or goods carrying business this is a reason that would outweigh any which might be brought out against the cars, for this form of construction allows keeping the vehicles in service and therefore earning money for the largest possible part of the time.

It is not possible to give a complete list of the makers of front drive cars, as this would mean too much space, and no such list has ever been compiled so is not at hand. Three makers who are known to be building front drive cars are: Christie, New York City, a description of whose cab is given in this issue; Haydock Automobile Company, St. Louis, Mo., and the Four Drive Traction Company, Mankato, Minn., the latter firm's product being both front and rear driven—that is, what is called four-wheel drive.

FROM NEW YORK TO DENVER

Editor THE AUTOMOBILE:

[1,907]—I am contemplating taking a trip from Buffalo to Denver this summer. Will you please, through your "Letters Interesting and Instructive," tell me the best route. This can best be done, I think, by naming the towns and cities through which we should pass. OTTOMAR O'DONNELL.
Fishkill-on-Hudson, N. Y.

Section 4 of the official A. A. A. Blue Book, which will appear early in July, will give the roads from Buffalo to Omaha, Neb., passing Cleveland, Toledo, South Bend, Chicago, Clinton, Ia., and Omaha, Neb. Beyond that point the road would take in Grand Island, Neb., Julesburg, Fort Morgan and Denver.

STARTING ON MAGNETO

Editor THE AUTOMOBILE:

[1,908]—Will you kindly state, to settle an argument, whether it is possible to start an engine on the magneto, not once nor twice, but regularly every time?
Hoboken, N. J. BEN DAY.

It is not only possible, but very probable, since as a matter of fact a number of the good small French cars have no other source of ignition, and an increasing number of our best American cars are being fitted up in this manner. Nearly all of the magneto manufacturers are marketing some device to aid in spinning the armature or otherwise helping to produce a spark the first time, no matter how often it is tried. Very recently, in these columns, a device called a switchstarter was described, the function of which was to send a sudden current through the primary windings as soon as the switch was touched. This actuated a contact breaker, which sent current from a special accumulator through the primary armature circuit.

Another device was in the nature of a clutch, which was operated to free the magneto shaft when it was desired to start the engine. This being free, other forms of mechanism whirled the armature around very rapidly several times, invariably producing the desired spark. The clutch automatically slid back into place when the motor had been started and was running normally. Other and equally successful devices have been brought out for this purpose, their action being so certain that one is safe in saying as above that it is perfectly possible to start on the magneto not once or twice, but every time.

DUAL IGNITION QUERY

Editor THE AUTOMOBILE:

[1,909]—Will you please give me some advice on the subject of dual ignition? I am about to buy a car and am in doubt between two makes, one with dual ignition, and the other with magneto ignition only. Which would you advise and why?
Poughkeepsie, N. Y. T. H. LLOYD.

It is a fact that the progress in igniting apparatus, in magnetos particularly, during the past year has been remarkable, and as sold to-day they are very efficient and reliable. Starting has always been the magneto "bugaboo," but the up-to-date magneto has overcome this and stands on a par with any other obtainable source of ignition in this respect.

This being the fact, why would you wish to complicate matters with an additional system which you will never use unless you have an accident to the major system? If the latter is not reliable, why put it on at all? If it is reliable, why not depend upon it and dispense with extra weight, cost, mechanical and electrical complications?

It is urged against the use of a single

system, that it is similar to putting all the eggs in one basket, so that any accident puts the car *hors de combat*. But if a second system is provided, one simply switches over to it and comes home as if nothing had happened, the major ignition being fixed up at leisure. It is reasonable to assume, however, that a minor system carried for hundreds or thousands of miles preparatory for the accident that may happen may itself get out of order, so that when called upon it cannot respond. In this case the cost, weight, and complication would go for naught.

The experience of millions of miles running with the cars of a public service corporation abroad proves that with two complete and distinct ignition systems the drivers are careless with both on the assumption that if one gets out of order the other can be used. With single ignition it is necessary to take care of the system, for it is the *only* source of current. The added care necessary in the latter case resulted in a very large saving upon the universal adoption of a single source of current, and it just happens that this was the form which has been argued for above, namely, the magneto system.

Without knowing the two cars which you have in mind, or without actually advising you which one to purchase, it would seem best for the beginner to begin on a car with single ignition, whichever form that may be, although the argument, as given above, has seemed to favor the mechanical current generator.

PERCENTAGE OF GRADES

Editor THE AUTOMOBILE:

[1,910]—Won't your figures in regard to the grades on the Pacific Coast, referred to on page 833 of the May 20 issue of "The Automobile" bear revision?

An average grade of 13 per cent. for a distance of 160 miles would certainly be "some Alps." E. C. HILLIARD.

Hartford, Conn.

Our correspondent is correct in his statement that this would be "some Alps." The mistake made by a contributor, and not checked up by us, simply goes to prove that the oft-reiterated statement that per cent. and actual rise of grades are not generally understood contains more truth than poetry or fiction.

Yet this is very simple, the per cent. of any grade, just like any other per cent., is the number of parts in a hundred, in this case, the number of feet rise in one hundred. The easiest way to figure grades is to reduce the length of the slope to feet and divide by one hundred, or what is the same, point off two decimal places. This gives the number of hundreds of feet. Now divide the total rise by this, and the result will be the per cent. of the grade.

Figured on this correct basis, the statement on page 833 of THE AUTOMOBILE should read as follows: "This gives an average grade of .24 per cent., and good braking will be at a premium. The next day, from Oakley to Salina, there is a drop of 1,818 feet but the distance is nearly 200 miles, so the average of grade is a little less than .18 per cent."

As very appropriate right here, a table of grades taken from *The Automobile Trade Directory*, is given herewith. In this the rise is given in feet per mile, but if this misleads anyone, it is a simple matter to divide the whole last column by 52.8, which reduces the figures found there to feet per hundred as described above.

TABLE OF GRADIENTS

Grade. Per cent.	Units.	Equal to Angle of	Rise in One Mile.
20	1 in 5	11° 19′	1056 feet
17	1 " 6	9° 28′	880 "
14	1 " 7	8° 09′	754 "
12.5	1 " 8	7° 08′	635 "
11	1 " 9	6° 17′	586 "
10	1 " 10	5° 43′	528 "
9	1 " 11	5° 11′	480 "
8	1 " 12	4° 46′	440 "
7.75	1 " 13	4° 24′	406 "
7	1 " 14	4° 05′	337 "
6.5	1 " 15	3° 49′	352 "
6.25	1 " 16	3° 35′	330 "
6	1 " 17	3° 22′	310 "
5.5	1 " 18	3° 11′	293 "
5	1 " 19	3° 00′	277 "
5	1 " 20	2° 52′	204 "
4	1 " 25	2° 18′	218 "
3.3	1 " 30	1° 55′	155 "
2.8	1 " 35	1° 38′	151 "
2.5	1 " 40	1° 26′	132 "

EIGHT-CYLINDER ENGINE

Editor THE AUTOMOBILE:

1,911]—Will you kindly give me the name and address of the firm making the eight-cylinder engine illustrated and described on pages 744 to 746, issue of "The Automobile" for May 6? Also would you explain if it will run as smoothly as an ordinary six-cylinder? F. R. BROSIUS.

Columbus, O.

The engine is named the E. N. V., after the firm making it, the latter also being called E. N. V. Motors, Ltd. The works are located at Rue Saint-Germain 23, Courbevoie, Seine, France.

The matter of smooth running depends upon the torque, which was discussed in full in the article in question, so that there is no necessity for going into it again and in this place. As for a direct answer to your question, this would be yes.

MORE ACID IN OILS

Editor THE AUTOMOBILE:

[1,912]—In re your reply to No. 1894, is it not possible to detect the presence of acid in lubricating oils with litmus paper?

Milwaukee, Wis. CHAS. W. NORRIS.

While litmus paper is extensively used for the detection of the presence of acid, it is believed that it is not delicate enough for this purpose, the amount of acid present in oil being usually very small. The methods given, on the other hand, are used for very delicate work, and will indicate correctly the presence of even the slightest trace of the destructive acid.

For the benefit of those who are not familiar with litmus paper, it might be described as an unsized paper saturated with a certain solution and cut into small short strips of perhaps one-quarter inch width by two inches length. One of these strips inserted in a solution containing acid, loses its natural colorless appearance and turns an angry sort of pink color. When inserted in an alkaline solution, on the other hand, it turns to a bright blue. The color is the same in the presence of much or little acid or alkali, so that at best its use but indicates the presence and not the amount of either.

It is repeated that the very small amount of acid in ordinary oil probably would not color the paper, so that its use, while possible, would indicate nothing. The test given in answer to 1894 was an accurate test, and shows not only the presence of acid, but also the amount.

SOME ANCIENT HISTORY

Editor THE AUTOMOBILE:

[1,913]—Your recent editorial on tire sizes is correct and along right lines, but your history is slightly in error. Large-sized tires have always been obtainable and the Duryea which won the first American auto event in November, 1895, was fitted with 44-inch and 48-inch single tube tires of 2-inch section. The three Duryeas which scooped all prizes in the second event, the Cosmopolitan race, Decoration Day, 1896, were fitted with 34-inch and 38-inch tires of 2½-inch size, single tube. A few Duryeas were built in the next year or two with 30-inch and 34-inch tires, but the standard of 30-inch front and 36-inch rear, both 3-inch size, was adopted in 1898. The first few of these were single tubes, but the Dunlop tires of those days were not made in molds and so could be had in any size desired and they were adopted shortly after this and used steadily since. Duryea Buggyauts are fitted either with these sizes of pneumatics or with 38-inch and 44-inch solids of 1¾-inch and 1⅜-inch size. Being identical in construction, they give a chance to compare the results as your wish expresses.

No very accurate comparisons have been made, but the difference is noticeable. The small wheels drop into the holes in the road and toss the riders more than do the large wheels and solid tires. On the other hand, the air tires swallow the rocks and stop the myriad small vibrations much better than the solid rubber on the large wheels. The air tires and small wheels do not roll so easily ordinarily, for the large tire must flatten the dust, sand, mud or snow, whereas the narrow tire cuts through. At speed the favor is with the air tire, but the best time between Reading and Philadelphia is held by the car with solid tires and large wheels. My feeling is in favor of large wheels with solid tires. That if fitted with pneumatics, they would be better goes without saying.

In my experiments I have simply tried to get the size of wheels which, with solid tires, would ride practically the same as the most-superior, commonly-accepted air tire sizes.

I have also experimented with solid tires of same wheel diameter as the pneumatics, but although these were as large as 2-inch or even larger, they were noticeably objectionable. The large wheel has merits that can not be denied. Just how large the wheels can be with good results I do not know. Carriage makers, after generations of use and experiment, stick pretty close to 44-inch front and 48-inch to 50-inch rear. Roads are slowly getting better, which will allow slightly smaller sizes. Auto speeds are higher and being fitted with better rubber or air tires, the auto wheels should be somewhat smaller. Having satisfied myself that 36-inch is the low limit for wheels that carry much load, I do not look for much increase above this.

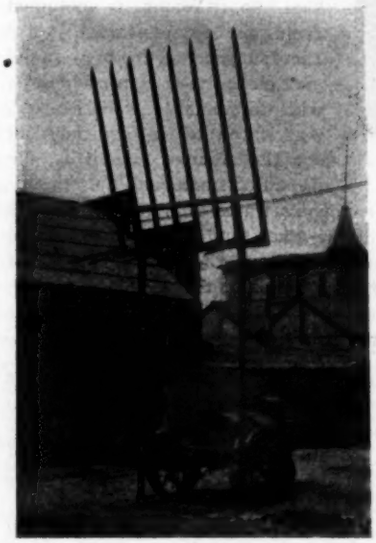
Makers generally will hold to the lowest that the public will take. That this limit is not a guess is pretty well proven by the fact that users of Duryeas seldom carry an extra tire. Extras are confessions of weakness. One user writes me in the last few days and says "Two of the tires have not been off the rims in three years and still folks complain about tire troubles."

The reason why small tires were used was because the maker wanted to save money and so supplied the smallest tire he could get the public to take. Further, the tire maker guaranteed the product, so the maker had very little care as to what size went on. Not till the makers kicked did sizes increase. Yet many of the older makers fought hard for larger sizes. Haynes, for example, stuck to large wheels from the very first. Winton did much the same. The toy steamers are largely responsible for saddling the industry with bicycle-sized tires. Certain it is that practical rigs should never have used them, and a large percentage of our auto troubles have arisen from wheels too small, with consequent discredit to the industry.

CHARLES E. DURYEA.

A MACHINE OF ABSORBING INTEREST TO FARMERS

DRUDGERY marks much of the daily routine work of the average farmer's life, and any device which promises to reduce this purely repetition work of the farm, and is not too radical, is finding ready adoption among the up-to-date tillers of the soil. The invasion of the country districts by the automobile is an accomplished fact, so that a machine resembling an auto or having a similar source of power would not come in the "too radical" class. For this reason as much as for its intrinsic merit a newcomer in the farming machine line, constructed by a Western man and herewith illustrated, will find instant favor with the farmers.



Rear View, Ready for Stacking

It is called a "hay-buck and stacker," from the work which it is intended to perform, namely, that of collecting hay from the fields, bringing it to a central point, and stacking it there. In addition, however, a number of attachments may be made to the original hay-buck, fitting it for as many other duties, and by their very large number making the whole machine a farming implement applicable on every farm, by every farmer.

The "Hay-buck" is the invention of Jacob E. Liebhart, a rancher residing near Los Angeles, Cal. Mr. Liebhart's prime idea was to reduce the hardships and expense of farming by means of a mechanical device which would do the same work at the expense of a less number of horses and a largely decreased number of farm hands.

After proving out the first machine to his satisfaction, he added, without impairing the original functions, successively a plow, a cultivator, seeder, cutter bar, rake, scraper, ditcher, and grader. The additions take the whole machine out of the class of specialized machinery for a single line of work, and thus suitable only for large ranches where the expense of a machine is trifling in comparison with its annual saving, and by making it able to do grinding and cutting of feed, weeding, pumping water, harvesting beans, beets, etc., and many other kinds of work always done heretofore by horses, puts it into the class of minor economies, which every farmer must practice to compete with his natural opponents, his neighbors.

The machine is propelled by a two-cylinder vertical 20-horsepower automobile engine, and may perform all of its functions with the assistance of but two men.

A Comparison with Old Methods—With the horse-operated hay-buck and stacker, as used at present, eight horses are required, as well as three hay-bucks, a stacker, wire cable and the other parts to make up a complete outfit for moving hay from shock to stack. This outfit costs about $1,500 and requires seven or eight men to work it at an average cost of $20 per day. Its use is restricted to two months of the year, and during the remaining ten months must stand idle, in which situation it represents unproductive capital in a place where capital is scarce and every dollar should be at work all of the time.

In case of accident or delay the expense of both men and machine continues, and even while in use the deterioration is large unless the machine is carefully housed. When not in use the very size of the old-fashioned machine calls for excessively large storage houses; moreover, a large space is required for operation and wide bridges for its accommodation when moving from place to place. All of these items, added to the large amount of money tied up, made it expensive to possess.

Horses Are Both Crude and Clumsy—Added to the economical reasons which militate against the older form, the sources of power—horses—are crude, hard to handle and awkward in operation. Each team averages about one and a half miles per hour. A team drives out, picks up three shocks of hay, turns and pushes back to the stack. After unloading they back off, turn again and are driven back to the starting place to begin over. At the stack the load is hoisted and dumped at a considerable loss of time, and at best in a tangled mass. This is difficult to handle, and requires the laborious efforts of three men, whose efforts are greatly hampered by the necessity for dumping all of the hay in one spot. This is required by the fact that the stacking machine remains stationary during the completion of a stack.

The single position also results in producing an uneven stack, which is solid in but one place, both of which items add to the cost of baling. Not only does the work of the horses cause trouble and the inherent difficulties of stacking add to this, but the day's "stunt" is frequently decreased by the breaking, kinking, cutting or heating of the cable.

A stack having been completed, much time is consumed in moving to a new position, during which interval the men and machine are busy, but producing no effective results.

Newer Method Saves Both Time and Money—The "Auto-Hay-buck and Stacker" combines all of the parts into a single machine, requiring but two men to attend it, horses being eliminated. The two men are placed, one on the machine and the other on the stack. Cost of operation falls in this way to less than $7.50 per day, almost one-third of the previous cost for labor alone. On the operation of bucking and stacking hay the automatic averages from four and a half to five miles per hour, over three times what the best horses can produce. Moreover, the machine runs equally well backward or forward, so that no time is lost in turning or backing. The engine can approach the stack from any side, so a more symmetrical stack results, this being effected with less men and less labor on the part of the men. The man on the seat of the machine has a comfortable seat, and by changing off with the man on the stack both are more comfortable all of the time, and thus able to do more work, or, if necessary, to work longer hours. The resulting stack being even, is baled more readily and quickly.

There are two sizes of the machine as now built, and the smaller, which is suitable for the ordinary small farm, costs about $1,500. With all of the various attachments it can be worked continuously in the field, in the grading camp, on the road during the

Seen at Closer Range When Starting a Stack

Six-Horse Team of the Nineteenth Century Hauling Ore on Desert Road

day and pumping water at night. It can be handled or stored in a small space, and will cross normal-sized bridges.

Easy to Understand and Operate—In case of accident or delay but two men and no horses are standing around idle. The mechanism, being simple, is readily repaired, and the same simplicity makes it easy to operate. The automobile engine used is beginning to be familiar on the farm, and the operation of the hay-buck is therefore easily understood.

From a humanitarian point of view, it is a distinct advantage as well. The process of stacking and bucking hay is a hard one, the ground around the stacker gets cut up to quite a depth and makes the work hard on the horses, while moving the stacker is equally hard on them.

OLD AND NEW ON THE DESERT

By H. H. DUNN.

Side by side on the old Dagget road, which leads from the mining camp of Ord to the old town on the Salt Lake railroad, twentieth century methods are competing with those of the nineteenth century.

Once a narrow trail, followed by creeping burros laden with sacks of ore heavy with gold, the way has been widened until it has become a broad path from camp to town. First to cause this widening were the teams of six to twenty horses driven by the men who hauled the ore down to the railroad cars. But now has come a new conqueror to the desert.

All the terrors of the waterless, sunburned road have given way to this new steel monster, which, carrying its own food and water, eats up the miles relentlessly, drawing behind its broad wheels—for it is a modern improved traction engine, built especially for the desert—wagons which carry fifty tons of ore where the old horse-drawn wagons carried ten.

Progress with the new tractors is as fast as the walk of the teams that once pulled ore wagons over this trail, and today the engineer waves his hand to the teamster as each gives half of the road to the other in going to and fro between the camps. But the horses and their drivers are fast passing from the trail; where once were dozens of these teams there are now only the few whose contracts with the mining corporations give them sufficient work. The steam tractor, which has recently conquered the terrors of Death Valley and is now making its way into other parts of the desert, is taking their place and doing the work of several teams at less than the cost of one.

For some of these engines fuel is brought in in the shape of tanks of oil, but the roots of the greasewood bushes alongside the road furnish most of the material with which steam is kept up. Water is obtained from the same storage tanks that supplied it to horses and men on the trail in former days, with this in favor of the tractor, that less water is required than for the animals. As it is, the thread of smoke and the screaming whistle of the tractor trailing its trains of hundreds of tons of ore over the level floor of the great sand plat present a vivid contrast to the long lines of horses and the choking clouds of dust that once crept slowly over the same trails.

Steam Tractor of the Twentieth Century Hauling Ore Over Same Trail

CLEVELAND TRADE IN INDUSTRIAL DISPLAY

CLEVELAND, June 7—Automobiles play an important part in the Cleveland Industrial Exposition which opened here this evening. The exposition is solely for the benefit of Cleveland manufacturers, and is intended to boost home industries. All kinds of manufactures are included in the exposition, provided they are located within the limits of the city of Cleveland.

Not even the originators of the movement realized how the automobile manufacturing trade had progressed of late.

All the local factories are exhibiting, including Stearns, Peerless, Royal, White, Gaeth, Winton, Baker, Rauch & Lang and Broc (electric), while all the many parts and accessories made in the Forest City are also shown. The Elwell-Parker Company, manufacturer of electric chassis, has quite a display, while the Perfection Spring Company and many others are prominent.

Farmer Thought Auto Was a Locomotive—Down in Texas it is said that there is a greater demand for automobiles than in "any other State of its size in the Union," but at least one man there was not familiar with the auto until recently. He was then forcibly introduced. In walking along the road he was struck by an auto whose driver had blown his horn loudly and expected that the pedestrian knew what was coming. After taking account of stock the farmer said that he had heard the horn, but thought that it was a locomotive on the nearby railroad.

HEAT VALUES OF ORDINARY AUTOMOBILE FUELS*

By DR. FRITZ HUTH, Berlin, Germany

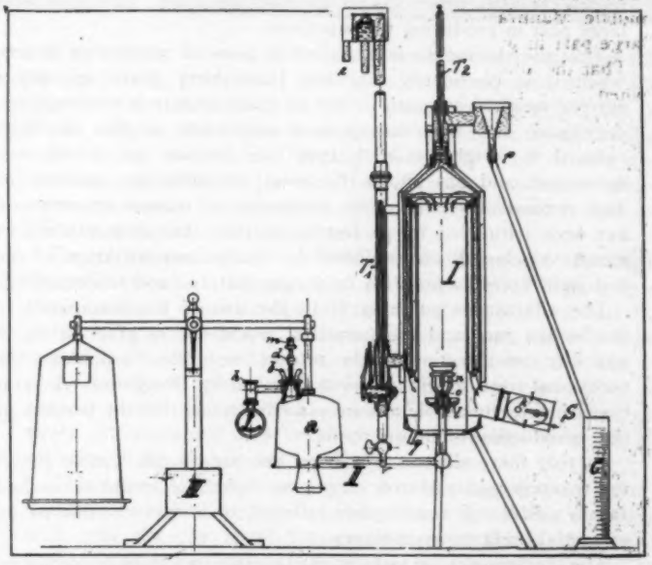
CONSTANTLY increasing expense for fuel has brought the automobile industry to the necessity of providing a cheaper combustible for this purpose, unless the economy of the commercial motor wagon, which has given such promise for the future of the industry, should be given a setback by being placed in question solely on account of the high price of benzine (gasoline). This has led at an earlier date to the undertaking of an investigation by the industrial protective bureau into the merits of home products, such as alcohol, without, however, having reached a successful conclusion as yet.

Now that so many new fuels have been placed on the market about the same time, the field is much wider than previously. Therefore, it is necessary that the driver who is in doubt as to how far the recommendation concerning a new fuel may be accepted, or whether it is adapted for use in the carbureter of his motor, or whether its use will be detrimental to the motor itself, should know how many heat units per kilo the new combustible contains. All these various questions cannot be referred to the single test mentioned of the fuels concerned for an answer. Not alone what may be the heat value of a certain fuel, but also what is the maximum allowable price to be paid for it, are questions of considerable interest. Consequently, with one of its most important characteristics definitely determined, a relative value may be assigned to it. Likewise, its standard of specific gravity will also be known, this being ascertained with the aid of a hydrometer.

For determining the heat value of the fuel, a Junker calorimeter is employed, and as this is an instrument not generally known, except to the technical fraternity, a short description of its construction and method of working will be of interest. It consists of the peculiarly shaped oven or combustion chamber I, surrounded by a water jacket, and the lamp II, suspended from the beam of the scale III. The lamp, which is of the ordinary type used for soldering, consists of the reservoir *a*, through the opening of which, *b*, some 200 cubic centimeters of the fuel to be tested should be poured. The burner *n* consists of a spray nozzle through which the combustible must be forced before arriving at *o*. *D* is a valve, and *m* is the cap belonging thereto, while *h* is a screw on the pressure gauge by means of which the operator may regulate the amount of air pressure on the fuel in the reservoir of the lamp. The apparatus is made ready for operation by burning a little alcohol in the cup of the burner *l*, in order to heat the latter, or it may be warmed with the aid of a Bunsen burner. A small hand air pump is then connected up with the valve *d*, in order to place the fuel to be tested under pressure.

Operation of the Apparatus—The liquid combustible then rises to the height of the burner, is sprayed out of the nozzle, and burns with a lightless flame. When the opening of the spray nozzle is properly regulated, gas pressure is created, which is held in equilibrium by the pressure on the interior of the vessel *a*. The lamp, which will now continue to burn without further attendance, is so placed on the end of the arm of the scale in order that it may project into the combustion chamber as far as possible. The hot gases rise in the direction indicated by the arrows, then being deflected downward again through copper tubes and finally escaping into the open air through *S*. The butterfly valve *k* serves as a means of regulating the draught through this opening. The tubes are filled with water, which as it expands through heating overflows into *c*. In a by-pass formed by the filling tube of this water jacket, consisting of the tubing mentioned, is placed a thermometer calibrated in tenths of degrees, T_1, while at the top of jacket just before the overflow is reached there is a second thermometer of the same type, T_2. Thus the temperature of the water upon entering and leaving the apparatus may be taken. The water escapes at *p*, and at this point as well as at *e*, the inlet, an overflow is provided in order to equalize the pressure of the water throughout the apparatus. The outlet *p* is provided with a rubber sleeve by means of which an extension tube is attached to it in order to conduct the overflowing heated water to the measuring vessel *e*. The hot gases give up their heat to the cold water so completely that it flows out at an almost constant temperature. The small outlet *q* permits of the escape of any water of condensation, an accurate measurement of the quantity of which is necessary to the determination of heat values.

A small weight is placed in the scale pan seen depending from the reservoir of the lamp *a*, and the investigation proceeds automatically as already described until sufficient of the combustible under test has been consumed to permit the pointer of the scale to return to the zero mark. The moment this occurs, the tube



Calorimeter Arrangement Used in Determining Heat Values

extending from *p* is dropped into the graduate *c*, and another weight, say 10 gr., is placed in the scale pan. As soon as the amount of combustible represented by this weight is consumed the pointer of the scale again touches the balance point, and the tube from *p* is immediately withdrawn from the graduate and the amount of water which has overflowed into the latter is determined. In the meantime both the thermometers, T_1 and T_2, have been read several times. The amount of water escaping at the outlet *q* has also been collected in another graduate.

Method of Figuring the Results—Results are arrived at by taking the number of liters of water *W*, overflowing from the apparatus, with relation to *T*, the temperature difference as recorded by the thermometers, T_1 and T_2: *G*, the weight of the combustible consumed during the course of the experiment, and calculating the number of heat units evolved by the formula:

$$H = \frac{W.T}{G}$$

This represents the higher heat. The lower heat is found by taking the number of cubic centimeters of water of condensation for each 10 grammes of the fuel burnt and multiplying by 60, the resulting quantity then being subtracted from the result given by the calorimeter for the higher heat value of each kilogramme of liquid.

With each variety of combustible at least three or four experiments should be carried out, 10 grammes of the fluid being

*Translation from "Der Motorwagen" (German).

burnt and the temperatures read from minute to minute. The values given in the following table are the mean averages of these experiments. The figures given are the results of 50 tests. Even the heat value of lubricating oil has been ascertained, because in calculating the efficiency of a certain fuel for motor operation the high heat values of the lubricant that is burned should not be neglected.

As mentioned at the outset, the heat value alone cannot be taken as affording a certain and final indication or measure of the worth or economic value of a fuel. In order to arrive at this many other factors must be taken into consideration, such as its entire performance under varying conditions and speeds, as well as with various types of carbureters, and this will be the object of an investigation to be given later.

HEAT VALUES AS EXPERIMENTALLY DETERMINED

Fuel.	Spec. Grav.	Higher heat Values.	Lower heat Values.	Price per 100 kg. in marks.
Naptha	.708	11,200	10,350	19.50
Benzine	.785	10,000	9,400	33.50
Benzine	.720	10,500	9,850	38.00
Benzine	.688	11,300	10,500	27.50
Benzol	.877	10,500	9,350	22.00
Dapolin	.695	11,300	10,450	24.50
Ergin	.908	9,900	9,400	21.00
Petroleum	.784	10,950	10,300	23.75
Lubricating	.890	10,000	9,350	.....
Alcohol	.822	6,250	5,300	30.40

THE AUTOMOBILE AS A FEEDER OF CIVILIZATION

By HERMANN F. CUNTZ, A. L. A. M.

IN 1898 there were not more than 200 automobiles made and put into use in the United States. In 1909 the total number of automobiles made and sold in the United States will approximate 82,000, the members of the Association of Licensed Automobile Manufacturers, as in the last six years, playing a very large part in producing the machines.

That the automobile is a marvelous piece of mechanism is seen when it is considered that less than thirty years ago prime movers weighed as much as 800 or 1,000 pounds per horsepower developed, and that the modern automobile engine has been reduced in weight to well under ten pounds per horsepower developed, and has shown its great reliability by running for days without stopping. This perfection of engine construction has been paralleled by perfection of the other elements of the motor vehicle—all accomplished in the commercialization of the last eight years by progress in design, material and workmanship.

The advantages accruing from the use of the automobile to the human race and the industrial world are so great as to, in any fair consideration of the subject, more than counteract the occasional narrow-minded view fostered by thoughtless elaboration of unfortunate details necessarily incident to the process of the introduction of motor traffic.

In 1907 there were accidents on railroads in the United States to 110,000 people, and over 10 per cent of these accidents resulted fatally. Still, of course, the railroad is always considered an esssential thing in any country.

The horsepower of which the average automobile produced this year is capable is about twenty, the 82,000 machines making an aggregate of 1,640,000 horsepower. At the beginning of this year there were in use in the United States over 184,000 automobiles, capable of close to 4,000,000 horsepower. The harnessing of water power at Niagara Falls to the extent of a few hundred thousand horsepower was hailed as a stupendous accomplishment.

Considering the passengers carried per mile by railroads in the United States in 1908, as compared with the number of people carried per mile by automobiles, we find that in the same time and territory automobiles furnished seven-tenths of 1 per cent of the number of passenger-miles the railroads furnished. What will the relative percentage be in 1915? Taking the rate at which railroad construction and traffic and the use of the automobile are increasing, at a conservative estimate, the automobile will provide 7 per cent as much passenger traffic as the railroad.

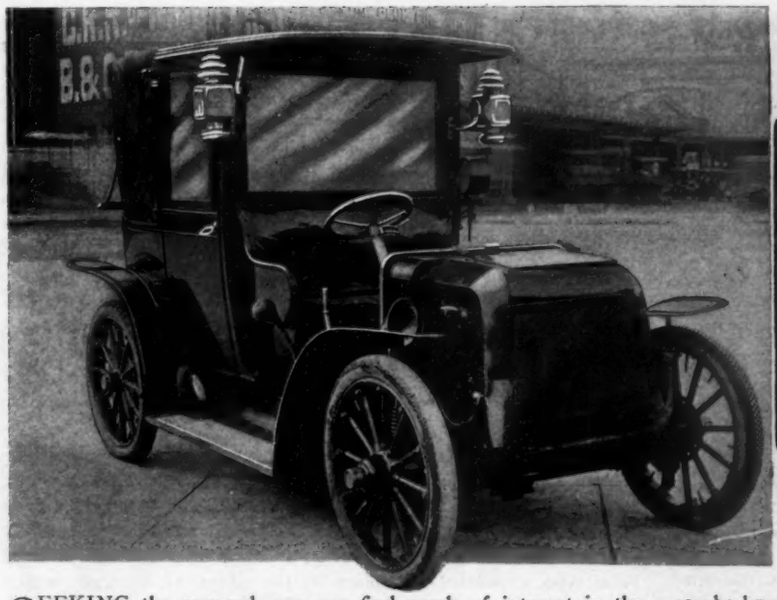
In small freight transportation the motor will gradually supplant the horse, on account of less cost and greater convenience.

Before ten years shall have passed 10 to 15 per cent of the American farmers will own automobiles.

The railroads of this country have spent, as charged to cost of construction and equipment, over thirteen billion dollars; practically within the last forty years. It is futile to gainsay the fact that an expenditure on the common highways of this country in the next forty years of a sum equal to the private outlay on railroads in the last forty years would be anything more than warranted, reasonable and wise.

Six Best Shots in the World, in a Winton Six, at Hill Top Gun Club, Paris, Kentucky

From left to right noted "shootists" are William Crosby, O'Fallon, Ill.; Fred Gilbert, Spirit Lake, Ia.; T. A. Marshall, Keithsburg, Ill.; R. O. Hicks, Dayton, O.; William Herr, Concordia, Kan. On the running-board, C. A. Young, Enon, O.



Walter Christie's Front-Drive Autocab

SEEKING the unusual, one can find much of interest in the just-completed Christie front-drive cab, which the manufacturer and inventor, Walter Christie, of Eleventh avenue and Twenty-third street, New York City, says is the only proper solution not alone of the complicated cab situation, but of the question of ultimate drive for all automobiles.

Mr. Christie is a versatile inventor, having to his credit the revolving turret for warships, a very efficient form of packing for steam pistons of large diameter, and other innovations. But his pet is the combination front drive and front steer, to which ignorant and unthinking ones have applied the title of "freak." This really is a misnomer, for it presents nothing of the odd or whimsical, as freak is defined, but, rather, contributes ideas worthy of much thought.

Not only is the new car, which is of small power, comparatively light weight and suitable primarily for taxicab use, equipped with a front drive, but the block motor shows a number of carefully worked out details, while the transmission is a masterpiece of rugged yet small and compact work. The wheels, too, designed by Christie especially for cab work, are based upon an idea which may be generally adopted before long.

All engineers are aware that in cam and roller actions sudden movements demand that the cam surface traveled over by the cam-roller should always turn in a direction away from the point of roller-lever hanging, and that cam actions so sudden in angular variations that they will not run at all when the cam runs towards the axis, run smoothly and at high speed when the cam is turned the other way. The road surface and the vehicle wheel form an exact mechanical parallel to the cam and cam-roller, and every motor car rider is well aware that in all cases of hard work with rear wheel driven cars, the rear wheels try to go ahead of the front wheels, and often succeed in doing this, much to the agitation of the passengers.

Mechanically the Situation Is Grotesque—When it comes to driving with the rear wheels and steering with the front wheels the situation becomes mechanically grotesque, the suitability of steering with the driving instead of with the driven wheels being so wholly obvious. With rear wheel driving and front wheel steering, the front wheels can be given only a small angle, as they are pushed sidewise by the drivers, and cannot be given nearly so short a radius angle as is desirable. Where the front wheels are both drivers and steerers, the front axle can be turned square around at 90 deg. to the pulled, trailing rear axle, same as a truck driver heads his horses crosswise of the road when he wants a short turn, and the car will start with ease.

All of this has long been known, yet automobile builders put the cart before the horse, and assert their own wisdom in so doing, although in point of fact only one single valid argument can be brought forward in favor of rear wheel driving. But this one is potent; rear wheel driving is the accustomed thing, and therefore the easy thing to sell, although it has a full list of faults and not one virtue as compared with front wheel driving.

More than one auto builder has tried front wheel driving and steering, notably in the German "fore-carriage," pushed to failure some years since, some experts claim, simply because it was not suitably designed and constructed.

The greatest advantage of front wheel driving and steering is the pull instead of the push, and the possibility of turning in a circle having a diameter equal to the wheelbase plus one-half the gauge. There is, however, a secondary advantage, which is alone and of itself amply sufficient to call for serious consideration of motor-cab front driving and steering. This is the possibility of a front motive and steering assembly of small dimensions, entirely self-contained and very readily detachable from the remainder of the chassis and car-body assembly.

This means that with one extra fore-carriage for, say, every ten cabs, the whole ten can be always kept in working condition with only the one small fore-carriage assembly in the repair shop, and all ten of the bodies and rear wheels assemblies out on the street earning money. With the rear wheel drive any failure back of the motor puts the whole car on the sick list, if, indeed, the motor is so constructed as to be readily removed from the car, which is very seldom the case.

Summation of Front Drive Advantages—Summed up, the front drive arrangement conduces toward the elimination of skidding, because it has been found by experiment that the free rotation of the rear wheels, which, by the way, is only found in the front drive, practically reduces the question of side-slip to a negligible quantity. Various attempts have been made to solve this problem by the use of front instead of rear brakes. This is on the order of a half-measure, and as such is a waste of time.

While the inventor has yet to build more than the one cab, the details of this as embodying a principle that is fundamentally correct are worthy of mention.

Engine Set Across the Car—The first radical point of difference is noticed in the position of the engine, which is set across the frame, at right angles to the ordinary practice. Moreover, it is combined with the front axle in a detachable way, a two-speed and reverse transmission being interposed and an expanding band clutch is utilized.

The four cylinders of the engine are cast in a unit with the upper half of the crankcase. The bore is 3¼ inch and the stroke 5 inch. The engine is slated to deliver at least 18 horsepower, which it does easily at 1,500 r.p.m. The top of the cylinder block, comprising an opening for the core print of perhaps 5 inches wide and 14 inches long, is normally covered by a plate,

from which the water outlet arises. The lower half of the crankcase, with the supporting feet which tie it to the front axle casing, is one of the other parts, while the cover for the gears at the front of the engine completes them. The drawing showing the construction displays the careful designing incidental to the building of the car in a number of ways. The metal between the cylinders is 1-4 inch, but at the ends, where there is less necessity for this amount of metal, it is reduced to 7-32. The water jacket thickness is right down to the limit of good foundry work, 1-8 inch.

The pistons have the pin fast in the rod, this being of 3-4 outside and 7-16 inside diameter. To care for the wear of the pin rotation, the piston bosses are bushed with phosphor bronze. The piston is of good length, 3 3-4 inches, and fitted with three 3-16 rings, all above the pin. These are cut diagonally. The connecting rods are of the usual I-section, the ends being 1-2 inch wide. Two bolts are used to hold the big end bearing, and these are of 3-8 diameter and special steel. The offset of the rods necessary to allow the central bearing being used is 1-2 inch.

Crankshaft Shows Excellent Design—In the mainshaft, the heart of the engine, is shown the ability of the designer. This is of as large diameter as is consistent with the power, the crankpins being 1 1-2 by 1 7-8 long. The bearings, on the other hand, are even larger than this, being 2 1-2 inches in diameter, with the end ones 2 1-8 long and the center 1 1-2 long. The bearings are plain, following usual practice. The shaft is very short, less than 18 inches over all, which short length, coupled with the three bearings, should make for great rigidity.

The engine is water cooled, the water circulation being very short. From the top cover plate there is a short pipe leading to the center of the tank forming the top of the radiator. The rest of the cooler consists of two banks of vertical copper tubes, about 280 in each, arranged at the outside of the car. The base of the radiator is another tank, into which the copper tubes are brazed, and into which the water flows in two streams from the two sides of the cooling surface. From this lower tank another short pipe leads to the pump, of bronze and medium diameter, which pumps it into the cylinder block at the base of the water jacket between the two central cylinders.

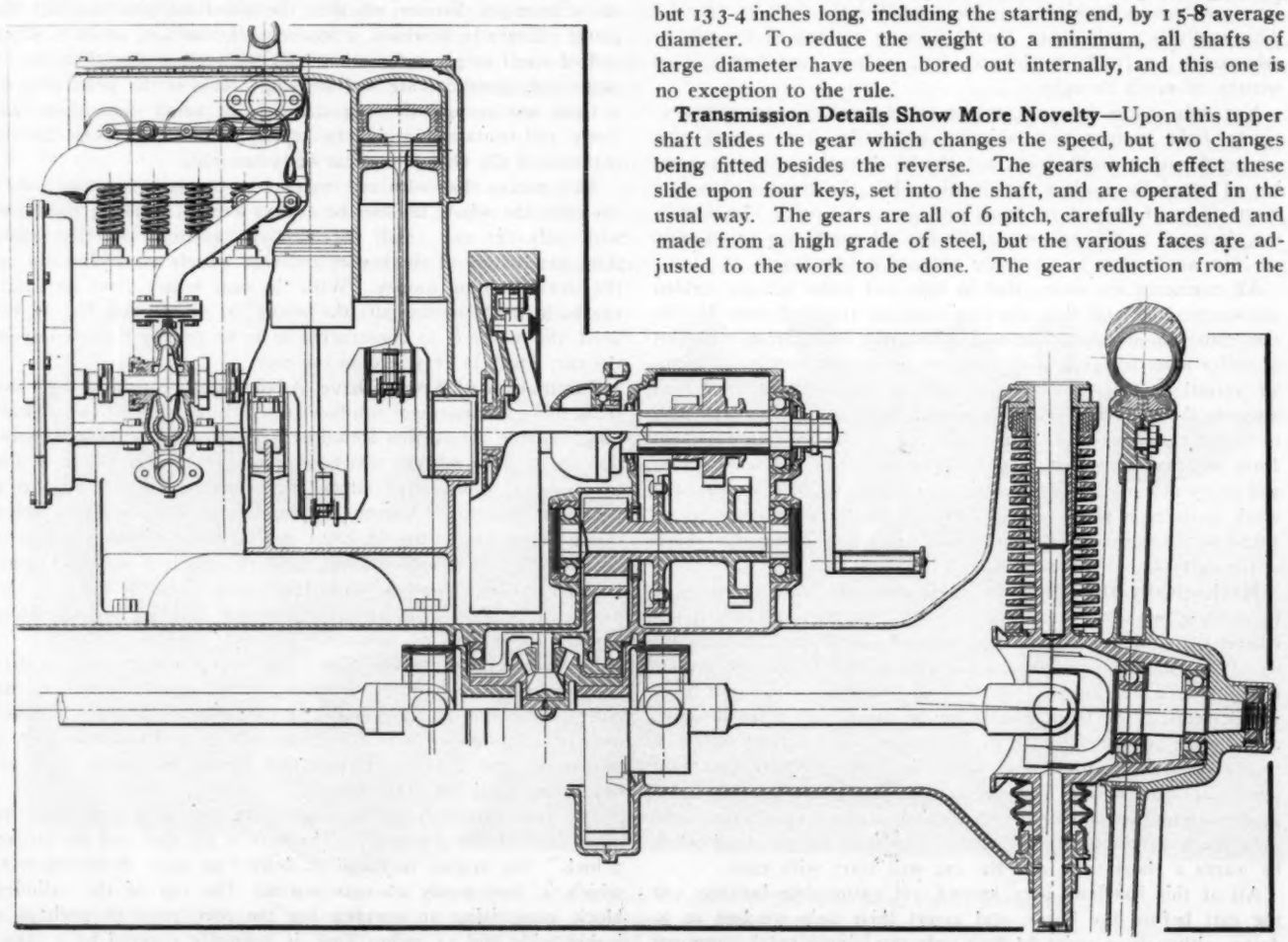
The pump is of bronze, with stuffing boxes on each side, and is driven by a special auxiliary shaft, which also drives the magneto, placed on the same side of the engine, the inside towards the radiator. The pump is driven through a pair of couplings one on each side, which allow of its ready removal.

The air to cool the water is drawn through the banks of tubes by a fan belt driven from the flywheel, and hung on a bracket which is movable, the movement being such as to alter the tension of the belt. The usual position of the engine makes that of the fan axis, which is parallel to it, equally unusual, namely, across instead of parallel to the car.

At the right-hand end of the engine shaft is attached the flywheel, which, of 14 inches diameter, with a rim 2 3-4 wide by 1 1-4 thick, aside from balancing the engine so as to produce even and regular rotation, also carries the clutch within it and safely covered from the dirt and dust. This clutch is of the internal band type, expanded into place by the action of a toggle, which is in turn actuated by the sliding forward or back of a conical-shaped piece upon the surface of which the rollers of the clutch rest. The clutch is of 1 3-4 face and 11 1-2 inches diameter.

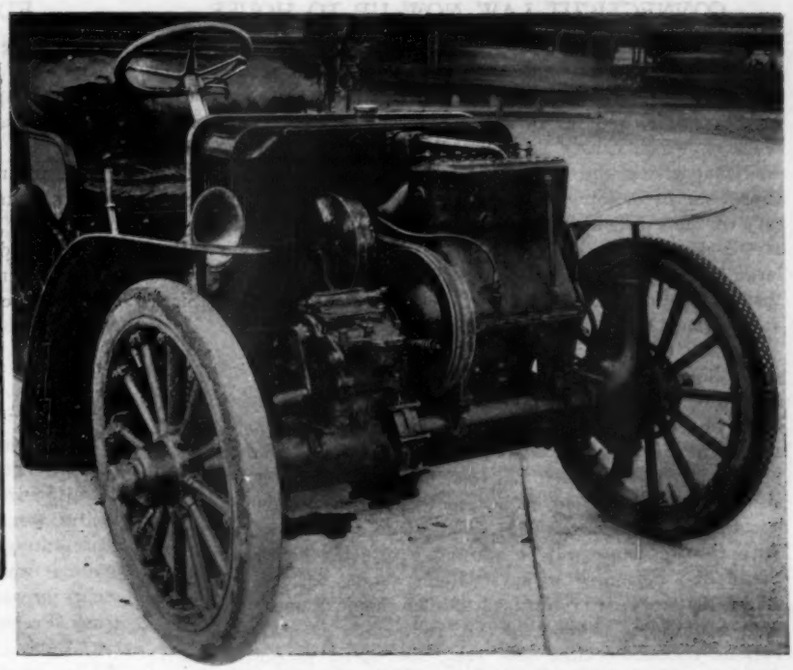
The disposition of the clutch shaft, which is at the same time the main or upper shaft of the transmission, is peculiar. The large diameter end of the crankshaft is turned out to receive a bushing at that end, within which bushing the forward end of the transmission shaft turns. This bushing is plain, but the one at the other end is of the radial ball type, also arranged to take thrust. Like the crankshaft, the mainshaft is very stubby, being but 13 3-4 inches long, including the starting end, by 1 5-8 average diameter. To reduce the weight to a minimum, all shafts of large diameter have been bored out internally, and this one is no exception to the rule.

Transmission Details Show More Novelty—Upon this upper shaft slides the gear which changes the speed, but two changes being fitted besides the reverse. The gears which effect these slide upon four keys, set into the shaft, and are operated in the usual way. The gears are all of 6 pitch, carefully hardened and made from a high grade of steel, but the various faces are adjusted to the work to be done. The gear reduction from the



Christie Front Axle, Motor, and Transmission Assembly Looking Forward from the Driver's Seat, Partially in Section

The Control Is Standard



Full View of Front Axle Construction Shows Starting Handle at Left

engine to the road wheels is 4 to 1, and on the low speed just half of that, or 8 to 1. Thus, the gears for the high speed are but 7-8 face, which is increased to 1 inch on the low. This, in turn, is increased to 1 3-4 inches in the gear which carries the final drive to the axles.

This is right below the transmission, and the drive from the latter is by spur gears. The final gear, upon the axle, is attached to the housing of the differential, which is of bronze. The differential, of the bevel type, is located near the center of the axle, the casing of which is split at that point to permit the ready removal of the parts. On each side of this case are large diameter ball bearings, beyond which are the first pair of universal joints, one on each side. From this point to the ends a pair of 1 1-2 shafts transmit the power to the wheels through the medium of another pair of joints, the latter being located in the exact center of the wheels. This location makes the function of steering easy, for the wheels rotate around the same center about which they move to effect the steering. The axle is housed within a cast bronze tube of 6 3-4 inches outside diameter with 3-16 walls, which is what gives the front view of the car its bulky appearance.

This Form of Drive Calls for Different Springs—Upon the ends of the axle housing are placed the springs, which, from the very nature of the construction, are radically different. They are of the coil variety, the outer diameter of the coil varying from 3 1-8 at the top to 3 3-4 at the bottom. The steel comprising the coils is rectangular in section with the longest side in a horizontal plane. The section is 5-8 by 1-4, and each one has 18 full coils. Above the top end and under the lower extremity are placed bronze thrust washers.

What corresponds to the knuckle pin is of very large size, 1 1-2 diameter, bored out inside to 7-8 inch, and projects above the universal joint casing 6 1-2 inches, of which 3 inches has a bearing when the car is not loaded, but with heavy additions to the load this may increase up to 6 inches.

Upon the stub axle end the wheels run on a pair of ball bearings of large size. These are located very close to the line through the wheel center, the inner one being but 1-8 inside of the center of the tire and but 1-16 outside of the center line through the spokes. The axle stub at the inner bearing has the unusual dimension, for this weight of car, of 1 3-4 inches, which decreases to 1 9-16 at the outer one, but 2 5-8 farther away.

Beyond this the end tapers, and upon this taper is mounted the heavy hub, which is held in place on the taper by a nut, cottered in position, and further retained in place by the hub cap, which would effectually prevent it from backing off, even if the cotter pin were forgotten.

The rear axle is of very simple construction, and is as plain as is consistent with the fact that it carries nothing but the springs and the large-sized brake drums. These brakes are internal expanding, and are operated by means of a cam.

The front wheels incline outward so that the tire centers are one inch farther apart on top than at the bottom, while the gauge is 52 1-2 on the road. With this small tread, a wheelbase of 100 inches, and the large angle of steering possible, the whole vehicle may be turned in a radius of 12 1-2 feet, or in a 25-foot circle. Steering is effected by the medium of a worm and sector, with a diagonal connecting rod to the left knuckle and a straight rod joining the two wheels, the latter being placed in the rear of the axle, where it is protected.

Even the Wheels Show Marked Ingenuity—The construction of the wheels is a far cry from what one would expect, for, beginning with the hubs just spoken of, the whole wheel is radically different, these having been designed especially for the cab service. The requirements may be summed up as: exceptional strength, particularly for side strains; lightness, and of a shape or form which lends itself to quick replacement. It is well known that the steel tube is, weight for weight, one of the strongest shapes made, and it is of this shape that Christie has constructed his spokes, thus obtaining at a bound both strength and light weight. These steel tubes are forced into seats machined in the hubs and then clamped to the felloes with retaining bolts, which hold on the loose flange of the rim as well. In this manner a new felloe and inflated tire may be substituted for a deflated or punctured tire in the time it takes to tell it. By using bolts, brazing is dispensed with and the quick tire change made possible. Both front and rear wheels are the same size, 32 by 3 1-2. This seems like a small size, but in view of the light weight, 2,100 pounds, is ample.

The body is the regular cab equipment of landaulette body, but the bonnet varies, being more like the style affected for so many years by Panhard. It pulls forward for removal, but for cases of ordinary trouble the top portion may be raised. The starting crank may be seen at the left side of this bonnet.

The price of the cab, complete, ready for the road, with lamps, horn, tools and spare parts, is $2,600.

CONNECTICUT LAW NOW UP TO HOUSE

HARTFORD, CONN., June 7—Now before the House of the State Legislature is a bill, already passed by the Senate, which has been introduced as a compromise for the law proposed early in the session, and the new one bids fair to pass. One of the features, which caused so much discussion in the previous bill, was that giving the control of automobiles and the like to a supervisor of motor vehicles, but in the present form the secretary of State will have charge as heretofore. The substitute bill also makes the speed limit 25 miles an hour, provides a rather large license fee for cars of 40 horsepower and over, and states that all cars must be muffled between 9 P. M. and 6 A. M. Siren and exhaust horns are also prohibited.

The fee for motorcycles is set at $1; for commercial vehicles regardless of power, $5; for automobiles controlled by liverymen, $10; for cars of manufacturers, $100, and for those owned by or under the control of a dealer, $20. Private owners will be subject to the following charges: For cars of less than 20 horsepower, $6; cars above 20, but less than 30 horsepower, $10; cars above 30, but less than 35 horsepower, $15; cars above 35, but less than 40 horsepower, $20; cars of 40 horsepower or above, $40. Non-residents will be allowed to use the highways of the State for a period of 10 days without taking out a license, providing that they carry the tags of their home States.

As is the case in most of the laws which have arisen in the various commonwealths this year, the speed proposition provides that autoists shall operate their cars at a speed no greater than is reasonable, and then stipulates that anyone traveling at a rate of more than 25 miles per hour, for a distance of an eighth of a mile, may be considered as being driven recklessly. Of course, there are the familiar provisions as to passing fractious animals, and if the car is in a crowded section of a town the limit of sane driving is 10 miles per hour. Three miles per hour is allowed an automobile when it is about to pass a trolley car which has stopped to discharge or receive passengers. All money received by the Secretary of State must be turned over for highway improvement at the instance of the commissioner.

SENATORS FAVOR AMERICAN AUTOMOBILES

The recent tariff discussions have brought out some very interesting side lights. Take, for instance, the following conversation which occurred during the discussion of the tariff bill before the Senate, the subject being the status of imported automobiles, and the sentiment expressed being a boost for high-class American cars, with the Packard used as an example. The excerpt below is from the *Congressional Record* of May 21:

Mr. Aldrich—It is not correct. There are at least half a dozen leading makes of automobiles that are imported largely.

Mr. Bacon—I have no information on the subject myself.

Mr. Aldrich—Eight or ten makes would include certainly most of the importations.

Mr. Bailey—If we could have the name of the maker and the country from which they come engraved on them, we would tell which Senators are riding in imported automobiles.

Mr. Aldrich—The foreign makers look out for that.

Mr. Hale—The Senator need not be alarmed about that. The marks will be on the machine.

Mr. Bailey—According to my belief, the marks of the people ought to be on some of the Senators who ride in imported automobiles.

Mr. Aldrich—I hope no Senator would ride in an imported automobile.

Mr. Bailey—I saw the Senator from Rhode Island riding in a very costly finished one and I wondered if it was made in this country.

Mr. Aldrich—It was made in this country. It was made in Detroit, Michigan.

Mr. Smith, of Michigan—We are very proud of it.

REEVES TAKES A WESTERN TRIP

Alfred Reeves, general manager of the American Motor Car Manufacturers' Association, left New York City Wednesday night for a tour of the Western factories. Incidentally, he may have a look at the Crown Point road races of next week.

EDGE HURRIES BACK TO ENGLAND

S. F. Edge, the well-known British autoist, and one of the big factors of Napier interests, sailed for home yesterday on the *Lusitania*, apparently quite well satisfied with his short American visit. In fact, he contented himself with the statement that he may return very shortly.

This means that there is undoubted truth in the story that the Napier Company may have an American factory of considerable magnitude. For several years an American company has built Napiers under a license from the parent concern, but this new project is understood to be entirely separate.

Mr. Edge created a decidedly favorable impression, and he frankly admitted being impressed with many things which he noted.

N. A. A. M. COMMITTEEMEN MEET AND TALK

NEW YORK, June 7—At the regular monthly meeting of the executive committee of the National Association of Automobile Manufacturers, held in the association rooms June 2, John N. Willys was elected to the board to succeed Col. George Pope, representing the Toledo Motor Car Company. Routine business matters were considered. William E. Metzger presided, and others present were: Thomas Henderson, Winton; L. H. Kittredge, Peerless; C. C. Hildebrand, Stevens-Duryea; Charles Clifton, Pierce; S. T. Davis, Jr., Locomobile; Windsor T. White, White; H. O. Smith, Premier; A. L. Pope, Pope-Hartford; C. G. Stoddard, Stoddard-Dayton; J. W. Gilson, Mitchell; S. A. Miles, general manager.

A. M. C. M. A. CONSIDERS SHOW PLANS

NEW YORK, June 7—New schemes of decoration and a new arrangement to secure additional space in the tenth international automobile show, which opens in the Grand Central Palace on next New Year's Eve, were important subjects considered by the show committee of the American Motor Car Manufacturers' Association in its meeting June 3. The Importers' Automobile Salon will, as usual, occupy a portion of the main floor, and the Motor and Accessory Manufacturers will again have the 16,000 square feet of space in the first balcony. At the meeting of this committee were: R. E. Olds, Reo; H. O. Smith, Premier; Alfred Reeves, general manager.

Routine affairs were discussed at the regular monthly meeting of the committee of management, held on the same day. Those present were: H. O. Smith, chairman, Premier; C. G. Stoddard, Stoddard-Dayton; R. E. Olds, Reo; S. H. Mora, Mora; W. H. Van Der Voort, Moline; Charles Lewis, Jackson; G. V. Rogers, Mitchell, secretary, and Alfred Reeves, general manager of the A. M. C. M. A.

ELECTRIC VEHICLE CO. REORGANIZATION

HARTFORD, CONN., June 7—All doubts as to the early reorganization of the Electric Vehicle Company of this city, the manufacturer of Columbia automobiles, has been swept aside by the order of Judge Cross directing parties in interest to show why a plan made by the reorganization committee should not be accepted. This committee presented the plans before the United States Circuit Court at Elizabeth, N. J., on Thursday, outlining an offer to take over the assets of the concern, barring the cash in the hands of the receivers. Since it became insolvent on December 10, 1907, the interests have been managed by Receivers Henry W. Nuckols, of this city, and H. M. Barret, of Elizabeth. The committee is composed of Herbert Lloyd and C. W. Woodward, of Philadelphia, and K. B. Schley, of New York, and by its plan the receivers would be able to declare a 20 per cent. dividend on the unsecured claim of $800,000. The bondholders of the $2,250,000, secured by general mortgage, would waive their security and accept the same dividend. The business would be taken over by a new corporation, under the laws of the State of Connecticut.

WHY MAKERS HAVE BEEN SLOW IN ENTERING

ACCORDING to Chairman F. B. Hower, of the A. A. A. Contest Board, the prosperous condition of the automobile industry is strikingly exemplified by the letters he receives regarding entries in the A. A. A. tour and contests for the Glidden, Hower and Detroit trophies. There is a sameness to many of them this year that he never has found before, he says. The manufacturers write that they want to be in the tour, and feel that they can illy afford to stay out, but that they have not entered before because they are so far behind in deliveries and so short of cars that they cannot see a month ahead.

"It is notable as showing the interest of the manufacturers that they are writing to me to explain why they have not sent in entries," says Chairman Hower. "In former years they have not taken this trouble to write, so it is plain that they appreciate more than ever the importance of participating in this one big touring contest. One and all, however, complain of being short of cars, and so busy at the factory as to be unable to spare any men. This is a splendid condition for the trade and I rejoice in it, but I hope the present prosperity does not lead to shortsightedness. It is very well to be oversold this year, but there are other years to come. There may be a glut of cars next year and there will be need of something to help sales along. The Glidden tour always counts for the year to come, not for the current year. It is the testimony of every maker who ever has participated and made a good showing that the Glidden tour record is a wonderful help in selling cars the following year."

Molines to Be Known as "Dreadnaught Squadron"

"Dreadnaught Squadron" is the name given to the three Moline Glidden Tour entries which have been entered in the runabout class competing for the Hower trophy. W. H. VanDerVoort, president of the Moline Automobile Company, is paying unusual attention to the three Molines, which will carry the numbers 100, 101 and 102. The three cars will be painted London smoke color and the crews will wear mohair uniforms of the same color.

It will be remembered that Mr. VanDerVoort entered three Molines at the close of last year's Glidden Tour after being fully convinced that the great American touring classic was by far the best automobile road event held in this country. The three Molines were entered several months before any other entries. All three cars will be the Model K, listed at $2,500, 35-40 horsepower, equipped with Bosch magneto and having a wheelbase of 116 inches.

"It is my desire to see the largest Glidden tour this year that has ever been held," says Mr. VanDerVoort. "The entire West is very enthusiastic because it is to pass through that territory this year, and in my opinion it is this section of the country which should be developed. The Middle West is unusually prosperous this year, especially the farmers, and a very large proportion of the motor car output is being disposed of out there."

Names of Cars to Be Carried on Tour Signs

A ruling concerning the tour has just been announced which will be highly pleasing to the manufacturers who enter cars and to the people of the country traveled through. The decision has been made to have the names of the cars, as well as their numbers, on the signs they carry. Hitherto the signs on the cars had only the words "A. A. A. Tour" and the year and the entry number of the car. This has been aggravating to the spectators, as well as disappointing to the entrants. All along the route of the tour some of the residents were to be seen with clippings from newspapers that gave the numbers and names of the cars, but from those not thus provided there was a continuous cry of: "What car is that?" The fact that the make of car is the first point of interest has been deeply impressed by experience upon Chairman Hower, and therefore the signs this year will be twice as large as previously and the names of the cars will be conspicuous on them.

CALIFORNIA ENDURANCE HAS FIVE CLEAN SCORES

SAN FRANCISCO, June 7—Five of the sixteen cars which participated in the second annual endurance contest over the San Leandro course, survived the ordeal with unsmirched records. The quintette contained these cars: Velie, Autocar, Mitchell, Interstate and Acme. Another Mitchell, an E-M-F, and a Studebaker 30, were three other finishers suffering from meagre penalties.

In this contest, held under the direction of the Automobile Dealers' Association, the success of a year ago was duplicated. Of the 16 cars which started over the 54-mile circuit, with 12 laps to go in 24 hours, half were able to finish, and during the entire trip, up until the last round there were generally over a dozen competitors on the roads. Starting on Sunday afternoon, May 30, they were required to keep traveling at high speed until the same time of Monday, May 31, with but slight margins from overstepping the rigid requirements for a perfect score. The penalties of those which finished, but not with clean slates, were very low. The Mitchell had 22 points for changing a spark plug and locating a broken wire; the E-M-F 4 points for a carbureter adjustment, and the Studebaker three points for stalling the motor. The roads were such as to give the competing cars strenuous tests without breaking them to pieces, and at the conclusion of the run all competitors expressed satisfaction.

Those cars which started, with their drivers, were: Apperson, Max Rosenfeld, S. K. Crocker; Buick, C. S. Howard, W. Powers, L. Andrews; Mitchell "20," E. Martin, A. E. Hunter; E-M-F, A. Eickmeier, M. S. Harris; Winton, M. L. Owesney, G. Arbuckle; Velie, A. D. Whitehead, H. Whitehead; Studebaker "30," J. H. Eagal, R. Newcomb; Buick, F. Gross, F. Murray; Mitchell "40," J. Sexton, E. L. Peacock; Autocar "25," P. J. Brown, W. C. Morris; Auburn, F. Bryant; Durocar, J. B. Robinson, J. A. Houlihan; Speedwell, J. H. Gordan; Interstate, G. C. Murray; J. F. Burkhard; Acme, F. Free, W. H. Middleton; Studebaker "40," S. Marshall. All but one of the contestants made the first round in good time, the exception being the Durocar on which the oiler stopped working, but after being repaired the car continued and unofficially finished nine rounds. On the second lap two other machines retired: the Auburn breaking a fan, and the Studebaker "40" running dry so that penalties which accumulated made it hardly worth while to continue. The Speedwell stopped in the fourth circuit with carbureter trouble from dirty gasoline, and then for three rounds the cars all kept running well, 12 of them contestants, and during the same period the Durocar also took to the roads. In the eighth lap the Winton broke a spring but it was repaired and the machine continued until the repair also gave way in the twelfth, and forced a stop. For two more laps the class kept up the fast work and in the eleventh one Buick, which had been having trouble throughout the trip, retired. The final lap witnessed the withdrawal of two other cars, the Apperson, which had a broken gasoline feed pipe, and the Buick, which had a valve break and this tore a hole in a piston. The fastest lap was made in 1:25:34.

Those who handled the contest were: Starter, R. R. l'Hommedieu; chief scorer, G. E. Johnson; chief timer, C. Kirkpatrick; chief observer, S. D. Rogers; clerk of course, George Mountz; judges, H. M. Owens, G. T. Sterling, W. M. Klinger.

WORCESTER MAY FURNISH NATIONAL HILL

WORCESTER, MASS., June 7—Following the visit to this city of Lewis R. Speare, president of the American Automobile Association, it has developed that this city may be a scene of future national hill climbs, for a grade has been surveyed near here that surpasses anything in this part of the country. It is located on the west side of the city, and has been measured accurately, showing a straightaway length of over a mile, with a grade of 25 per cent. in some places, and a steep enough average. President Speare assured John P. Coghlin, president of the Worcester Automobile Club, that if a road is built on this hill, it will be selected as the location of the national contest.

This information has given added impetus to the enthusiasm for the hill climbing events which will be held on Saturday on the Dead Horse hill, and the entries are more numerous than was expected. The big Benz will be driven by David Bruce Brown, the Fiat by Ralph DePalma, the Knox Company has listed four entries, including its Vanderbilt cars; and Basle will handle the Renault.

The officials for the climb have been announced as follows: Referee, Lewis R. Speare, president, A. A. A.; starter, Fred. J. Wagner; clerk of course, Charles F. Webb; committee of arrangements, George D. Webb, Daniel F. Gay, Herbert P. Bagley, A. H. Inman; timers, A. H. Inman, F. L. Murdock, G. B. Cutting, J. Walter Flagg; judges, Frederick Tudor, president, and J. Fortescue, secretary, Bay State Automobile Association; A. E. Bliss, president Massachusetts State Automobile Association, Malden; John L. Heinze, president Lowell Automobile Club; A. E. Lerche, president, and Stanford L. Haynes, Springfield Automobile Club; E. P. Charlton, president Fall River Automobile Club; E. H. Walker, president Brockton Automobile Club; A. D. Converse, president Winchendon Automobile Club; Charles P. Smith, of Springfield, president, and W. H. Chase, of Fitchburg, Wachusetts Automobile Club.

CHALMERS-DETROIT PERFECT IN JERSEY RUN

In the endurance run of the New Jersey Automobile and Motor Club for amateur drivers, held May 27, W. L. Ferguson made a perfect score with his 30-horsepower Chalmers-Detroit touring car. In the report of this contest in THE AUTOMOBILE of June 3, Mr. Ferguson was erroneously stated to have withdrawn after completing one lap and to have had five punctures, when in reality he finished the first round on the dot of the minute and the second lap but five seconds ahead of time. He had no tire trouble from start to finish, and was awarded a perfect score cup by the club. Confusion of numbers resulted in crediting Mr. Ferguson's score to the Autocar, driven by M. A. Carpenter, which immediately followed the Chalmers-Detroit and which should not have been given a perfect score in the story of the event. Attention has been called to the mistake by George Paddock, president of the Paddock-Zusi Motor Car Company, the Newark agent for the Chalmers-Detroit.

CHADWICK CLIMBER WAS A STOCK CAR

Nowadays, when the public is learning to differentiate between the performances of specially constructed racing craft and the more valuable efforts of stock cars, no manufacturer can be blamed for insisting upon credit when credit is due.

This is illustrated by an objection filed by the Chadwick Engineering Works of Pottstown, Pa., which demurs against being classed at the Wilkes-Barre hill climb as having participated with other than a stock car. Its six-cylinder climber is designated positively as "stock," and considering that with only half the horsepower of the 120 Benz it required only 4 2-5 seconds more in which to make the ascent, the makers take considerable credit. especially when such a flyer as the Fiat *Cyclone* was numbered among the defeated.

In the invitation event, from which the racing Benz was barred, the Chadwick won and made the journey up Giant's Despair in one-fifth of a second better than its earlier performance.

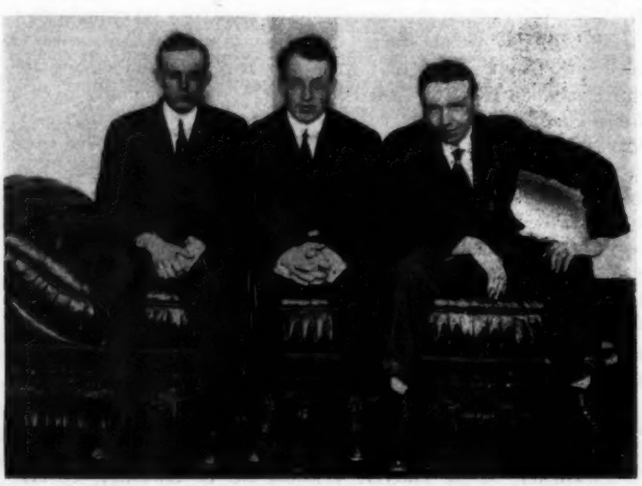
KOKOMO CELEBRATES HAYNES ANNIVERSARY

KOKOMO, IND., June 7—In honor of the sixteenth anniversary of the completion of Elwood Haynes' first gasoline automobile, this city took a day off on Wednesday for a fitting celebration, giving the business section over to the automobilists. The streets were roped off for contests, and business men devoted their time to serving on reception and other committees, while both the Haynes and Apperson factories entered heartily into the spirit of the affair. There were visiting delegations from cities and towns within a radius of 75 miles, so that several thousand persons saw the various events, including a parade in which about 200 cars participated. A brass band on the courthouse square enlivened proceedings, and Herbert Lytle, Loring Wagoner, and other well-known drivers took part in the contests. The courthouse square was also the scene of the races and other sports, there being a slow race which was won by Murden in a Haynes in 2:55, a reverse race won by McLain in an Apperson in :40 3-4; egg race, balancing contest, potato race, and class races for autos divided by their rated horsepowers. Edgar Apperson won a race for test cars of that make, and Miss Katrina Fertig, of Indianapolis, took both contests for women, driving her Premier. Herbert Lytle in an Apperson Jack Rabbit in the speed tests made :40 1-4 seconds.

ROBERTSON, ROBERTS, HAUPT: HOUPT TEAM

NEW YORK, June 7—Herreshoff and Houpt automobiles will be entered in many important races of the season, according to the plans made by Harry S. Houpt, and in preparation he has secured one of the strongest teams of racing drivers ever assembled in this country. George Robertson, the winner of the Vanderbilt and Fairmount Park races last fall, and of other contests, is at the head of the contest department. Montague Roberts, who has been at the wheel of Thomas cars in many big speed events, is a member of the team, but it is possible that his duties in the mechanical lines of the Houpt companies will prevent him from taking as active a part as his colleagues. Willie Haupt, who distinguished himself with Chadwick racers all last season by winning every important hill climb in the East and Middle West, and by leading the Vanderbilt race last fall for four laps, has come over from Philadelphia and is becoming familiar with Herreshoff and Houpt construction. The former cars are being produced in quantities and are now in a position to enter light car races and others in class, but the big Houpt machines will hardly be ready to make their contest début until the Lowell carnival.

It is probable that still another well-known racer will be engaged to make up a quartette, but as yet negotiations with him have not been completed. Suffice it to say, that by many he is rated as one of the best racing drivers in America, and with the others equally as well considered the new team will be watched with great interest.



Willie Haupt, George Robertson, Montague Roberts

DAYTONA TO GRAND RAPIDS IN A REO

NEW YORK, June 7—There arrived in this city last evening a two-cylinder Reo roadster which has already covered 1,500 miles and has about 900 more to go in a trip from the auto-famous beach at Daytona, Fla., to the Furniture City—Grand Rapids, Mich. Owned and driven by Charles A. Luce, of the latter place, and accompanied only by Mrs. Luce, the little car has had a strenuous mud-plugging tour, especially after reaching the sand and clay of the lower Carolinas, and has been on the go for 22 days, not including 10 which were taken off for rest or because of the heavy rains of late. Mr. and Mrs. Luce left the Southern resort on May 4, and will leave to-morrow on their way to their home via Buffalo and Cleveland. In speaking of the trp to date, Mr. Luce said:

"We have had a hard tour on account of the weather and road conditions, and because it has been necessary often to make short runs because we had to calculate upon our night stops. Frequently if we pushed beyond one small town in the South we would not reach another for many miles. Our route has taken us through Jacksonville, Lake City, Jasper, Valdosta, Macon, Atlanta, Salisbury, Greenville, Winston-Salem, Danville, Chatham, Staunton, Hagerstown, York, and Philadelphia. We have found every imaginable kind of road, mostly bad, but they will be improved shortly, for the people of the South have been stirred up beyond the Northern comprehension by the present movement. We ran from Atlanta to Greenville with the White scout car sent out by the Atlanta *Journal*, and we met R. H. Johnston in the New York *Herald* White scout car at Roanoke. The roads of the Carolinas, and of Georgia also, are nearly bottomless in wet weather, and I have found a route between Danville, Va., and Roanoke, via Chatham, that is far superior to the usual course via Lynchburg. My car was the first automobile over it.

"From Salisbury to Philadelphia we had a continual mud-plug, with only three sunny days, and of all the roads the pikes around Staunton were the hardest to travel because of the broken stone set on edge. Our tires were nearly worn through by them. I cannot say too much of the Reo, for it has made the run in wonderful shape, especially upon the hills and on muddy roads. From Salisbury to Roanoke we had to use low gear most of the time, but that had no effect upon the working of the car. Our route to Cleveland will be that generally taken by autos and we have not decided just when we will try to reach there, as we take the trip by easy stages, the best way for any persons on a long tour."

TRAVELS 134.3 MILES ON ONE CHARGE

PHILADELPHIA, June 7—The Woods electric victoria which made such a creditable record in the recent roadability run of the Quaker City Motor Club to Atlantic City, covering the 67-mile route in 4:35:40 on one charge, eclipsed that performance last Tuesday, when it negotiated the round trip of 134.3 miles on one charge of "juice." Driver George W. Daley, who swears to the correctness of the statement, makes further affidavit to the effect that after completing the homeward journey, the car was run until the odometer showed 152 miles, before the batteries were exhausted.

The actual running time to Atlantic City was 3 hours and 45 minutes, or 16.2 miles an hour. The return trip began at 4:18 P. M. and the electric drew up at the starting point, in front of the *Record* office, at 9 o'clock exactly.

On Thursday Mr. Daley gave the electric another try-out, this time for speed. A roundabout route of 89.2 miles was selected, and the car reached Atlantic City in a trifle over five hours, the average figuring out at 17.6 miles an hour. The odometer showed 104.2 miles before recharging was begun.

Marshalltown, Iowa—The Johnston Automobile Company has let the contract for the erection of a new garage, to be built of brick and cement, on East Lincoln street.

Cars That Carried Troy's Orphans at Van Rensselaer Park

TROY CLUB FETES THOUSAND CHILDREN

TROY, N. Y., June 7—Fully 1,000 orphans from the various institutions of this city were given an outing by the Troy Automobile Club on Wednesday. The members of the club contributed 130 touring cars for the purpose, and the little folk were taken to the local "Coney Island," after a ride of about 12 miles, where they were the guests of the club and management. Two hours were allowed for sight seeing and the enjoyment of the games, and then they were returned to the different homes in the autos, tired and happy. During the outward-bound parade every church bell in the city was rung and large crowds greeted the procession along the line of march.

DETROIT GAVE ORPHANS A GRAND TIME

DETROIT, June 7—Six hundred Detroit orphans were given the time of their lives last Friday as guests of the Detroit Automobile Dealers' Association and the Detroit Automobile Club. One hundred machines were furnished for the occasion. Frank Weldon, who officiated as master of ceremonies, provided each youngster with a small American flag, and as the procession sped along it resembled one grand stream of Stars and Stripes. No charitable institution in the city was overlooked. The only feature marring the festivities was the fact that one hundred children at the Home for the Friendless were unable to participate in the outing, the institution being quarantined because of diphtheria.

The orphans were given a ride about the city, over Belle Isle, with a visit to the "zoo"; out to Grosse Pointe and back—in all, about forty miles were covered.

At the conclusion of the run the older children were taken to the Pontchartrain and treated to light refreshments, bringing to a close the most successful event of its kind ever undertaken and giving to 600 orphans a day's pleasure they will long remember.

LONG AUTO RIDES FOR PITTSBURGH ORPHANS

PITTSBURGH, PA., June 7—An extended automobile ride was the important feature of the celebration of orphans' day in this city, in addition to the visit to the "Zoo" and a luncheon, under the direction of the Automobile Club of Pittsburgh. Friday was selected for the day, and almost 700 children were given a treat, beginning at 10.30 A.M., when the automobiles brought the little folk from the various institutions to Craig street, just off the Grant boulevard. A parade was formed and the cars run to Highland Park, where are located the wonders of the big zoölogical gardens. The cars then went over every bit of boulevard in the East End and landed their loads in Schenley Park at about 1 o'clock for a fine luncheon, which was served just beyond the Panther Hollow bridge, one of the most beautiful spots around the Smoky City. The parade began again after lunch, covering many more miles of boulevards, breaking up and leaving the children at their homes about 4.30 P.M. The committee in charge consisted of: Paul C. Wolff, secretary of the club; A. E. Neman, J. N. Hawkins, E. J. Kent and Edward Kneeland.

THE AUTOMOBILE

Vol. XX. Thursday, June 10, 1909 No. 23

THE CLASS JOURNAL COMPANY
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231-241 West 39th Street, New York City

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FRANCE:—L. Baudry de Saunier, offices of "Omnia," 20 Rue Duret, Avenue de la Grande Armee, Paris.
GERMANY:—A. Seydel, Mohrenstrasse 9, Berlin.

Entered at New York, N. Y., as second-class matter.
The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907.

WHAT WILL NEXT COME FORTH?

With the completion of arrangements for the sale of the whole of the product of this season, a number of the largest manufacturers are announcing the details of their models for the season which will follow. Many others who have not gone to this length have given out an idea of the principal features of the cars to which they will devote their energies, and of a third class, rumor only has spoken as to the product.

Thus it is that plans are made public, and among these plans are many which will interest the people; some for the folks able to buy luxurious cars, on which the improvements take the form of added luxuries, others (and these will be most numerous) will appeal to the great class of people who up to date have been nothing but "wishers" because of the prevailing prices.

It is to the latter class, only able to pay a very small price as prices go, but numerous in the extreme, that a few manufacturers will cater for the first time. These cars will be the very personification of simplicity, both as to number of parts and their functions, resulting in a simple and easily mastered control system. Many, if rumor is trustworthy, will be equipped with two-cycle engines, several of the differential piston type. But this seems like a case of saving at the bung-hole to waste at the spigot, for the fuel consumption of this type of motive power is notoriously high. Of what avail is a poor man's automobile at $1,000, if the fuel and upkeep cost is equal to that of a $4,000 machine?

Actually the increased upkeep cost would be a greater hardship than the greater initial expense, for the latter comes but once, while the former partakes of the nature of a continuous performance, which must go on as long as the machine is employed, and is only terminated when it is disposed of and the pleasure of use ceases.

One prominent development will be the absence of freaks in the class known as "best sellers," most of which will continue the present types without change. In this category come the six-cylinder motors for high powers, all of which will doubtless be continued as at present.

In the list of mechanical features worthy of mention, it is noticeable that the fuel question is being given increasing thought, and the 1910 cars will include many which are fitted for the use of a fuel other than gasoline, and still more arranged for fuel injection. An observed trend is in the ignition, single ignition with a magneto as a source of current being on the gain at the expense of other forms. Many of the very low priced cars will doubtless turn to the two-speed transmission, while there will still be many who adhere to the planetary type, with its inherently simple control.

Equally as conspicious as the newer features or the changes in the product of the high class producers will be the new faces in the industry, these being recruited chiefly from the implement, agricultural, and buggy manufacturers of the Middle Western States.

All told, the season of 1910 will make many remarkable changes in the industry as a whole, and much will be added to automobile history.

* * *

IN THE TRAIL OF THE BIG TOUR

Possessing roads that were such in reality, the more populous East naturally adopted the automobile with greater alacrity than the more sparsely settled West with its widely separated cities and lack of highways worth mentioning. Hence the annual national endurance tour generally had either its beginning or its finish, or both, in the Atlantic and Middle States.

But this year there is a plunge to the Northwest, and thence down into the Rocky Mountains country. The route traversed is a comprehensive one for the middle part of the country, and furthermore, direct attention to the automobile will be carried to thousands of people who are yet comparatively strangers to its pleasurable and time-saving necessities.

It would appear that those manufacturers who participate in this year's big tour are certain to realize substantially in one form or another, even though it is a certainty that under the rules laid down there cannot be any considerable number of tied trophy winners. The rules-making committee has been conscientiously at work for the past fortnight, and the results of its labor should prove uniformly acceptable.

Of course, the roads to be encountered will comprise good, indifferent, and bad, but not to such an extent as is imagined by the self-satisfied Easterner who deludes himself in the belief that nothing West of Buffalo, or Chicago at the extreme limit, is worth while in this big country. Many an automobile opinion will be revised in the trail of the 1909 Glidden tour.

DECISION IN SELDEN SUIT EXPECTED IN FALL

JUDGE HOUGH of the United States Circuit Court, Southern District of New York, has been well supplied with reading matter for his Summer vacation. Some 10,000 printed pages of testimony, including briefs filed by both sides, of some 1,700 pages, are now in his possession as a result of the hearing which closed Friday, June 4, after having continued for six days.

In view of the grasp of the situation which Judge Hough demonstrated during the hearing held in the Post Office Building, New York City, it is generally expected that a decision may be announced in the Fall.

The hearing was on a consolidation of a number of suits, in all of which the complainants were the Electric Vehicle Company and George B. Selden. The several defendants were C. A. Duerr & Company and the Ford Motor Co.; in another suit the O. J. Gude Co., and in another John Wanamaker. Coupled with these actions was the suit against Panhard & Levassor and Andre Massanet, its agent, as well as one against Henry and A. C. Newbauer, importers of automobiles.

Samuel R. Betts, of Betta, Sheffield, Bentley & Betts, opened for the complainant, and was followed by R. A. Parker, of Parker & Burton, who argued for the defendants, and particularly represented the suits directed against the Ford company and its agents. The defendants' argument was then taken up by John P. Murray, of Coudert Bros., more particularly representing the foreign manufacturers. William A. Redding, of Redding, Greely & Austin, then took up the rebuttal argument for the complainants, after which W. Benton Crisp continued the argument for the defendants, and Frederick Coudert closed for them. The closing argument for the complainants was made by Frederick P. Fish, Esq., of Boston.

When asked as to his opinion regarding the hearing, Hermann F. Cuntz stated specifically that he must refrain from expressing any views whatsoever. He explained that the case was now before the court, all the briefs had been submitted and the entire record that has been printed containing testimony taken in the past five years has been filed with the court, and hence it would be obviously improper in any way to forecast any opinion.

R. A. Parker gave his views of the matter as follows:

"It would not be proper for me to give my opinion as to which way I think that the Selden suit will be settled, as long as it is now in the hands of the court. Suffice it to say that I feel confident, as do my clients. It is probable that the decision will be rendered in the Fall, or perhaps later, because there is a mass of testimony to be considered. Our claims are too well known to need discussion, inasmuch as in the suit and the argument last week there was little dispute as to facts. We believe that the plaintiffs cannot hold a patent such as will prevent any man from using any liquid hydro-carbon engine in any road carriage, and because of it sue anyone who does. The patent could apply only to some absolutely new way of combining a certain motor with a certain road carriage, and the independent makers have not done this, and therefore are not bound by the patent to pay the royalties which are claimed. Thus I took the position that a motor which is capable of being applied, when combined with a road carriage capable of being driven by one or more of many motors, cannot be patented. That would simply be a patent of an old use, even if the motor is new, as long as it is a motor. Another point which we brought out was that Selden changed his claims after the Benz patents were taken out in this country in 1888, for although the Selden patent had been applied for first in 1879, the claims were changed in 1889 and the patent was not issued until 1895, so that during a period of years the patentee was benefiting by the experiments of others. Therefore we claim that he has not a right to a universal patent covering the subject, according to decisions of the Supreme Court.

"As to the probable developments after the decision, it may be stated positively that if the patent is upheld, we will appeal, and if the patent is not upheld, the plaintiffs are compelled to appeal by the contract between the A. L. A. M. and the other Selden interests. The only way this could be avoided by them would be to make a new contract and let the matter drop. At any rate if an appeal is taken it would not get into the next court until probably a year from next October, and it would take perhaps six months in the Court of Appeals, so that perhaps it would be two years from the present before another argument would be held, and it can be seen that the patent will nearly have expired, in 1912, before the case would be settled. Should it become necessary it might even be carried to the Supreme Court.

"This brings up another interesting point as to what may develop if the patent expires before the final settlement. If the present defendants, the independent manufacturers and importers, should finally win, the case would be dropped; but if the licensees should win, the question of damages would be a very important matter. It is my opinion that they would have great difficulty in trying to collect. Therefore I feel very confident as to the outcome, both in the near future and that farther away."

MACALMAN PRESIDENT BOSTON TRADE

BOSTON, June 7—The annual meeting of the Boston Automobile Dealers' Assocation was held to-day and the following officers were elected for the ensuing year: President, J. H. MacAlman, agent for the Columbia and Stearns; vice-president, J. S. Hathaway, manager of the White Company branch; treasurer, F. A. Hinchcliffe, manager of the Winton Motor Carriage Company branch; secretary, Chester I. Campbell; directors, the officers, and J. W. Maguire, agent for the Pierce; Charles E. Fay, manager of the Ford Motor Company branch; A. P. Underhil, agent for the Knox; C. F. Whitney, agent for the Alco and Stoddard-Dayton; E. A. Gilmore, of the Whitten-Gilmore Co., agent for the Thomas, Chalmers and Hudson, and Frank E. Wing, agent for the Marmon. Mr. Wink succeeds George H. Lowe, resigned, otherwise the organization is the same as previously.

RAIN POSTPONES CLEVELAND'S CLIMB

CLEVELAND, June 7—Rain coming up late Friday spoiled the roads for the annual Porter hill climb of the Cleveland Automobile Club. The climb will take place Wednesday, June 9.

S. A. E. HAS BEEN INCORPORTED

In order to carry out rather extensive plans for the future, the Society of Automobile Engineers has been incorporated, the papers having been approved in New York City Tuesday, by Supreme Court Justice Guy.

There will be twelve directors and the principal office will be in New York City. The incorporators named are as follows: Russell Huff, of the Packard Motor Company, of Detroit, Mich.; Andrew L. Riker, of the Locomobile Company, Bridgeport, Conn.; Henri C. Chatau, of the General Electric Company, Schenectady, N. Y.; B. D. Gray, of the American Locomotive Works, Providence, R. I.; R. C. Carpenter, of Sibley College, Cornell University, Ithaca, N. Y.; Henry Hess, of Philadelphia; F. J. Newman, of Chicago; Alexander Churchward, of 2 Rector street; Horace M. Swetland, and Thomas J. Fay, of 239 West Thirty-ninth street, New York City. The summer meeting of the society may take place in Chicago, probably in August.

Tungsten Lamps for Auto's Use—Miniature sizes of tungsten lamps can now be obtained for use on automobiles in the place of oil side lamps using kerosene, or for use in enclosed cars.


From New York to Atlanta
By "Pathfinder"
On the Scent
Road-Making in Virginia
Near High Point
When New York Met Atlanta
"Pathfinder" Takes a Drink
A Virginian Quartette
Governor Smith and Mayor Maddox Met the Route-Makers
Lee's Headquarters at Gettysburg
Equine and Bovine Education
Near Winchester, Va.
Temporary Road Repairs

IT is almost impossible to overestimate the enthusiasm for good roads which has been stirred up in the Southern States through the movement started by the New York *Herald* and Atlanta *Journal*. It was my good fortune to be selected to drive my White Steamer as the New York *Herald* "scout car" from New York to Atlanta. Never before in my touring experience have I seen such an ovation as greeted our party throughout our 1,100-mile journey, commencing from the moment when we were started on our journey from Herald Square by General Leonard Wood to the time when we were met on the outskirts of Atlanta by ex-Governor Hoke Smith, of Georgia, Mayor Maddox, of Atlanta, and several hundred of the leading citizens of the empire city of the South. During at least two-thirds of our journey, we were escorted by a convoy of from one to a dozen automobiles which came to meet us from various towns along the route. The garages where we stored our car over night refused to take payment for gasoline and other supplies and when we came to pay our hotel bills in the morning we found that we had been anticipated by the local chambers of commerce.

It would be too much to say that the sentiment for good roads was created over night by the enterprise of the two newspapers mentioned above. Undoubtedly the sentiment for good roads already existed, but it needed some concrete enterprise, such as a proposition to build a great highway between New York and Atlanta, to crystallize the good roads sentiment and to bring together in co-operation the various automobile clubs along the route, the principal civic bodies in the various cities, and the farmers' organizations in the rural districts. If one-half of the proposed bond issues which we heard about materialize, there will be more money spent on the roads between New York and Atlanta in the next six months than has been spent in the last six years. In the office of the Atlanta *Journal* I looked over several hundred newspaper clippings relating to good roads. Apparently, there is hardly a newspaper published between New York and Atlanta, either in a large city or in a rural community, which has not undertaken to agitate the good roads question in its editorial columns. It is my judgment that within two years the tourist may go from New York to Atlanta without any more fear of encountering severe road conditions than if he were to start for a tour through the New England States.

The route which we covered on our recent tour is one of two or three possible routes between New York and Atlanta. It is by no means the shortest route, but at the present time it is probably the best. The fact that we made the 1,125-mile trip in eleven days, despite the necessary stops for compiling road directions, for taking photographs, and for the receptions along the line, will indicate to every autoist that the route is a thoroughly feasible one, even in the present state of road conditions.

The route which we followed was as follows: southward to Philadelphia and then westward to Gettysburg; then southward again through the Shenandoah Valley to Roanoke, Virginia, then eastward to Danville. From that point we followed approximately the main line of the Southern Railroad through the prosperous regions of the New South all the way to Atlanta.

Considering our route from New York to Atlanta more in detail, the road from New York to Trenton is so well known as to need no comment. Going south from Trenton, most tourists go by way of Bordentown and Camden, but we took a shorter route by crossing the Delaware River by the Trenton bridge into Pennsylvania, and thus avoided the ferry at Camden and the narrow east-and-west streets of Philadelphia.

For 25 miles west of Philadelphia the road is perfect, yet it would seem that the time has come to eliminate the toll gates from the main highway leading westward from the third largest city in the country. After leaving the toll road, we found the road through Coatesville and Kinzer rather rough, but it improves again near Lancaster when we made good time through Wrightsville and York to Abbottstown. From there to Gettysburg, a distance of 15 miles, the road is very rough.

On the Battlefield of Gettysburg the roads were built and are maintained by the National Government, and, needless to say, are in perfect condition, just as they are on Missionary Ridge and the other national reservations where the nation has undertaken road building.

On leaving Gettysburg, on the morning of the third day of our trip, we had rather rough going for ten or fifteen miles, and then we came to a good macadam road which led us through Waynesboro, Hagerstown and Shepardstown to Winchester, Virginia, where we came to the famous Shenandoah Valley pike, over which we traveled another 95 miles to Staunton. Over more than two-thirds of the distance from Gettysburg to Staunton we paid toll at the rate of from three to five cents a mile.

Our run from Staunton to Roanoke, a distance of 93 miles, was made under very severe conditions. The roads had just been ploughed and were drying up from a hard rain of two days before. The soil was of a consistency which allowed the wheels of the car to sink in nearly to their hubs, and it was just stiff enough to make very hard pulling. Added to this, the going was mainly up hill, with the result that it took much more power to negotiate these roads than was necessary on any other part of the journey.

From Roanoke to Danville we had what could be called fair dirt roads, and this stretch of 117 miles should offer no particular difficulties. The same may be said of the stretch between Danville and the State line between Virginia and North Carolina. It must be understood, however, that the roads in Virginia south of Staunton were not laid out with reference to the requirements of automobile traffic.

The North Carolina roads, almost without exception, are good. Those in Mecklenburg and Gaston counties, particularly, are all that the tourist could wish for as regards smoothness, gradients, drainage, gradual turns and proper banking at the turns.

As for the roads of South Carolina and Georgia, I would say from my observation on this tour and on previous tours through this section, that they are good in dry weather and bad in wet weather. What the tourist wants, however, and what I am convinced will be obtained through the good roads movement started by the New York *Herald* and the Atlanta *Journal*, are roads that will be good in any kind of weather.

As regards the time for the average tourist to make the trip from New York to Atlanta, here again much depends upon the weather. In good weather, on a "keep-going" schedule, eight days should be sufficient time. In rainy weather it is probable that at least two weeks would be necessary. If the tourist should plan to see thoroughly all the places of historic interest and of great natural beauty along the route and, particularly, if he should accept all the invitations which are showered upon him by the hospitable people of the South, an entire touring season would be none too much to allow for the journey.

ALL WANT TO BE ON NEW YORK-ATLANTA ROUT

In the wake of the proposal to build a national automobile highway between New York and Atlanta came the rivalries of the cities and towns on the several proposed routes.

Leonard Tufts, a Bostonian well known in the development of Pinehurst, N. C., supplied excellent reasons for the route across North Carolina which would include Pinehurst and Southern Pines. From material Mr. Tufts sent out is the following:

G. N. McMillan has been a guest at Pinehurst for several years, and through his enthusiasm and interest in the subject he with others induced the people of Southern Pines and myself to build a road between Pinehurst and Southern Pines. This was the first really good road in the southern section of Moore County. Since then four townships have voted to tax themselves for good roads, and one has recently got a bond issue for $15,000. Mr. McMillan has been pushing and talking good roads for the past three years and has believed from the first that a highway from the North to the South would be made practical within a few years with proper organization and push. At first this seemed absurd to me and to others, but I believe his prophecy will come true during the coming winter. Captain W. I. Everett, of Rockingham, N. C., has been a great power in interesting people in Richmond County in building roads. There are a great many people, as for example, Dr. Gilbert McLeod, of Carthage, who has given his time for the maintenance of the roads; John R. McQueen, of Lakeview, who is responsible for the bond issue of McNeil Township. The result of this work is that this fall there will be a fine road across Moore and Richmond counties going by way of Vass to Lakeview, Southern Pines, Pinehurst, West End, Jackson Springs, Elba Springs and Rockingham, toward Cheraw to the South Carolina line.

Crown Point, Where the Storm Centre of the Contests Will Be

CHICAGO, June 8—Thirty entries—12 in the Cobe cup and 18 in the Indiana trophy—have been received for the road-racing carnival of the Chicago Automobile Club, set for decision June 18 and 19 over the Crown Point-Lowell course, the list officially closing Saturday at the regular fees, although it is possible for others to get in up to Thursday of this week upon payment of an extra charge of $250 a car. In point of numbers this compares most favorably with Savannah, which has the record with 37 entries.

Thirteen different makes of cars are represented in the two races, six being in the Cobe cup. In addition the Locomobile, Stoddard-Dayton and Buick are in both contests. The entry fees total $10,700. Drivers nominated include such stars as Robertson, Lytle, Strang, Florida, Poole, Denison and Bourque, the complete entry list reading as follows:

COBE CUP

Car	Driver
Apperson	H. Lytle
Apperson	Not named
Buick	L. Strang
Buick	R. Burman
Buick	L. Chevrolet
Fiat	E. A. Hearne
Knox	A. Denison
Knox	W. Bourque
Locomobile	G. Robertson
Locomobile	J. Florida
Stoddard-Dayton	C. A. Engubeck
Stoddard-Dayton	B. Miller

INDIANA TROPHY

Buick	L. Strang
Buick	R. Burman
Buick	G. DeWitt
Chalmers-Detroit	A. Poole
Chalmers-Detroit	J. Matson
Chalmers-Detroit	W. Knipper
Corbin	Not named
Fal-Car	E. M. Harrison
Fal-Car	A. H. Peirce
Ford	Not named
Locomobile	G. Robertson
Locomobile	J. W. Florida
Marion	H. E. Stutz
Marion	A. Monsen
Moon	P. Wells
Renault	A. W. Greiner
Stoddard-Dayton	H. Tuttle
Stoddard-Dayton	Not named

With the entry proposition off their minds the promoters of the contests are now busily engaged in completing the arrangements at Crown Point. The course is rapidly nearing completion, and it is expected the contractors easily will finish by the stipulated time—to-morrow. The entire circuit has been treated with taroid, and while there has been no attempt at speed, it is more than apparent that the course is lightning fast. Indeed, there is hardly a driver who has seen it who has not predicted a smashing of records in both events. Considerable difficulty has been experienced by motorists gettting on the course just for the purpose of trying it. Generally the result has been that they have had their cars plastered with tar, while the ravages of their wheels have compelled the road-makers to do additional work.

The big grandstand, which is designed to hold 10,000 people, is as good as done, although the contractors still have several days more in which to put on the finishing touches. The sale of seats for this stand is up to expectations, although the demand so far has been more for boxes and parking spaces. Only 30 of the 164 boxes remain, while the club has been forced to secure additional parking space. But from the inquiries the grandstand seat sale will open up before the end of the week, so that everything should be sold two days before the races.

General Executive Trego intends moving his effects to Crown Point on Thursday and establishing his quarters there. On that day the official drawing for numbers will take place, while practice on the course will not begin until next Monday because of the objection of the Lake county farmers, who did not wish to have their roads tied up for 10 days as was at first contemplated. The training will take place between 2 and 4 o'clock in the afternoon because of the fact that the farmers have to use the roads in the morning to make milk deliveries.

Noted Drivers Prepare for Great Contest

Already there is a gathering of the clans. Robertson and Florida, with their mechanics, Campbell and Ethridge, are here, and the Locomobile camp at Crown Point will be established to-night. week, few suspecting that the Detroiters were there. George Bill is in charge of the camp and he has with him five men and four cars. The third Chalmers entry was not made until the final moment, at which time the company announced that its drivers will be Al Poole, William Knipper and Joe Matson. Poole, everybody knows, formerly was Tracy's mechanic, and last year he drove the Isotta in several road races. Knipper has just finished the Denver-City of Mexico stunt and is hurrying home for the new venture, while Matson gained fame as the driver of the Corbin last year.

The two Fal-Cars are making their début in competition and the Chicago concern manufacturing them has been pushed to the limit to get them out in time. This delayed the entry to the final moment, when Sales Manager Averill turned in the check.

The Chicago Automobile Club is determined to make both races stock propositions, and to insure this the members of the technical committee already have started their work visiting the various factories. F. E. Edwards went to Flint and Detroit Saturday, while Berne Nadall swung into Indiana and Ohio last night. Chairman Beecroft goes East to-night. At each factory duplicate cars are examined and measured and before any one is allowed to start there will be another examination to see if the two sets of figures agree.

TABLE SHOWING GENERAL SPECIFICATIONS OF CARS ENTERED FOR THE CONTEST FOR THE COBE TROPHY

CAR	Entrant	Driver	No. of Cyls.	Cylinder Bore	Cylinder Stroke	Wheelbase	Clutch	Trans.	Speeds	Reverse	Drive	Cooling	Oiling	Ignition
KNOX	Knox Auto Co	Denison	4	5	4.75	106	Three-plate	Sel.	3	1	Shaft.	Gear pump	Gear pump.	Dual.
KNOX	Knox Auto Co	Bourque	4	5.5	5.5	106	Disk	Sel.	4	1	Chain.	Cent. pump	Gear pump.	Dual
LOCOMOBILE	Locomobile Co. of A.	Robertson	4	5	6	123	Cone	Sel.	4	1	Chain.	Cent. pump	Pump	Two.
LOCOMOBILE	Locomobile Co. of A.	Florida	4	5	6	123	Cone	Sel.	4	1	Chain.	Cent. pump	Pump	Two.
FIAT	Ed. W. Hearne	Hearne	4	5.1	5.5	126	Disk	Sel.	4	1	?	Cent. pump	Pump	Single.
BUICK	Buick Motor Co.	Strang	4	4.5	5	112	Cone	Sel.	3	1	Shaft.	Gear pump	Force feed.	Single.
BUICK	Buick Motor Co.	Chevrolet	4	4.5	5	112	Cone	Sel.	3	1	Shaft.	Gear pump	Force feed.	Single.
BUICK	Buick Motor Co.	Burman	4	4.5	5	112	Cone	Sel.	3	1	Shaft.	Gear pump	Force feed.	Single.
APPERSON	Apperson Bros. Co.	Lytle	4	5.75	5	116	Cont. band.	Sel.	4	1	Chain.	Gear pump	Force feed.	Single.
APPERSON	Apperson Bros. Co.	Seymour	4	5.75	5	116	Cont. band.	Sel.	4	1	Chain.	Gear pump	Force feed.	Single.
STOD.-DAYTON	Dayton MotorCarCo.	Miller	4	5.25	5.75	106	Cone	Sel.	3	1	Shaft.	Gear pump	Pump	Mag'to & bat.
STOD.-DAYTON	Dayton MotorCarCo.	Englebeck	4	5.25	5.75	106	Cone	Sel.	3	1	Shaft.	Gear pump	Pump	Mag'to & bat.

TABLE SHOWING GENERAL SPECIFICATIONS OF CARS ENTERED FOR THE INDIANA TROPHY

CAR	Entrant	Driver	No. of Cyls.	Cylinder Bore	Cylinder Stroke	Wheelbase	Clutch	Trans.	Speeds	Reverse	Drive	Cooling	Oiling	Ignition
CORBIN	Corbin M. Veh. Corp.		4	4.5	4.25	100	Cone	Sel.	3	1	Shaft.	Pump	Pump	Dual.
RENAULT	Arthur W. Greiner	Greiner	4	3.93	5.51	...	Cone	Prog.	4	1	Shaft.	Ther.-syp'n	Pump	Single.
LOCOMOBILE	Locomobile Co. of A.	Robertson	4	4.5	4.5	120	Cone	Sel.	4	1	Shaft.	Cent. pump	Pump	Dual.
LOCOMOBILE	Locomobile Co. of A.	Florida	4	4.5	4.5	120	Cone	Sel.	4	1	Shaft.	Cent. pump	Pump	Dual.
FORD	Ford Motor Co.	Dunnell	4	3.75	4	100	Disk	Plan.	2	1	Shaft.	Ther.-syp'n	F'd flyw'll.	Double.
CHALM.-DET'T.	Chalm.-Detr't M. Co.	Poole	4	4	4.5	110	Disk	Sel.	3	1	Shaft.	Cent. pump	Pump	Double.
CHALM.-DET'T.	Chalm.-Detr't M. Co.	Knipper	4	4	4.5	110	Disk	Sel.	3	1	Shaft.	Cent. pump	Pump	Double.
CHALM.-DET'T.	Chalm.-Detr't M. Co.	Matson	4	4	4.5	110	Disk	Sel.	3	1	Shaft.	Cent. pump	Pump	Double.
BUICK	Buick Motor Co.	Strang	4	4.37	5	112	Cone	Sel.	3	1	Shaft.	Gear pump	Force feed.	Single.
BUICK	Buick Motor Co.	De Witt	4	4.37	5	112	Cone	Sel.	3	1	Shaft.	Gear pump	Force feed.	Single.
BUICK	Buick Motor Co.	Burman	4	4.37	5	112	Cone	Sel.	3	1	Shaft.	Gear pump	Force feed.	Single.
MOON	Moon Motor Car Co.	Wells	4	4.5	4.5	112	Disk	Sel.	4	1	Shaft.	P'p, no fan.	Pump	Single.
STOD'D-DAYT'N.	Dayton MotorCarCo.	Wiseman	4	3.87	4.5	106	Cone	Sel.	3	1	Shaft.	Gear pump	Pump	Mag'to & bat.
STOD'D-DAYT'N.	Dayton MotorCarCo.	Wright	4	3.87	4.5	106	Cone	Sel.	3	1	Shaft.	Gear pump	Pump	Mag'to & bat.
MARION	Marion M. Car Co.	Stutz	4	4.25	4.5	112	Disk	Prog.	3	1	Shaft.	Cent. pump	Pump	Mag'to & bat.
MARION	Marion M. Car Co.	Monsen	4	4.25	4.5	112	Disk	Prog.	3	1	Shaft.	Cent. pump	Pump	Mag'to & bat.
FAL-CAR	Fal Motor Co.	Pearce	4	4.25	4.5	108	Cone	Sel.	3	1	Shaft.	Gear pump	Pump	Mag'to & bat.
FAL-CAR	Fal Motor Co.	Ruel	4	4.25	4.5	108	Cone	Sel.	3	1	Shaft.	Gear pump	Pump	Mag'to & bat

OCEAN TO OCEAN RACERS IN THE OPEN WEST

ST. LOUIS, June 7—Much like four spirited animals which have been held in leash and then suddenly turned loose, the quartette of autos which are racing from New York to Seattle left this city this evening, free to go as far and fast as they choose. Leaving New York on last Tuesday afternoon, they were kept well bunched by Pacemaker Gerrie until this city was reached, when the restrictions were removed, and at 8.15 o'clock this evening the two little Fords, which have been in the lead, swung out into the open country toward Kansas City, with the big Acme and the Shawmut not very long behind them.

NEW YORK ORPHANS' DAY POSTPONED

NEW YORK, June 9—Owing to rain the orphans' day celebration planned for to-day has been postponed until Friday. For the first time in five years, since the first outing given to the inmates of the city institutions, there has been enough cars offered, besides contributions of nearly $1,000 in cash for hiring machines. Between 150 and 200 automobiles were promised, and the donors have been requested to give the use of them on Friday. The capacity of these cars would be 2,000 children. The main portion of the day will be spent at Coney Island.

Tuesday the Long Island Automobile Club gave the orphans of Brooklyn their annual treat. Some 150 autos conveyed 900 children to Luna Park at Coney Island, which event was followed by a ride around the city. President Frank G. Webb, and Dr. W. P. Richardson, chairman of the committee, directed.

FORBES WINS BALLOON CHAMPIONSHIP

INDIANAPOLIS, IND., June 9—The balloon *New York*, with A. Holland Forbes as the pilot, is the winner of the national balloon race with a journey of 358 miles. The *University City*, Captain Berry as pilot, was second with 329 miles; the *St. Louis*, Lambert at pilot, third with 321 miles; the *Indiana*, Fisher as pilot, fourth with 264 miles, and the *Hoosier*, Captain P. S. Baldwin pilot, fifth with 234 miles. Captain Baldwin was the constructor of the winning *New York*. The handicap race was won by the *Indianapolis*, D. G. Link pilot, with 222 miles.

MANY ENTRIES FOR CATSKILL-BERKSHIRE RUN

NEW YORK, June 7—So far-famed is the touring ground of the Catskill Mountains and the Berkshire Hills, over which the New York Automobile Trade Association will hold its reliability contest next Saturday, Sunday and Monday, that there will probably be at least 35 cars in the party. They will leave Columbus Circle at 8 o'clock on Saturday morning, taking the Forty-second street ferry and reconvening on the Hudson County boulevard at Weehawken. The first night stop will be at Catskill, running via Suffern, Lake View hotel for lunch, Newburg and Kingston. The route on Sunday will be to Pittsfield, via Albany, and only the afternoon will be used in making the trip so that the participants may tour to Catskill Mountain resorts in the morning. On Monday they will return to New York via Stockbridge, Great Barrington and Poughkeepsie.

The cars which have been entered so far are: three Mitchells, three Franklins, three Stevens-Duryeas, two Stoddard-Daytons, two Oldsmobiles, two Marmons; one each of National, Lancia, White, Knox, Royal Blue cab, Packard, Autocar and Matheson.

MITCHELL AGNETS HAVE CONCLAVE

NEW YORK, June 7—To discuss the output of the Mitchell Motor Car Company for the next season, and to give the management a better idea of what the public wants, as seen through its local representatives, 25 of its agents held their annual convention in the Manhattan Hotel last week.

The following were in attendance: From the factory, William Mitchell Lewis, general manager; J. W. Bate, designer; James W. Gilson, sales manager; G. V. Rogers, secretary; George W. Osen, San Francisco; E. E. Gilmore, Jacksonville, Fla.; Fred Bennett, Portland, Ore.; J. Clarke Coit, Omaha, Neb.; E. H. Greer, Los Angeles, Cal.; C. F. Gilmore, Detroit; A. F. Chase, Minneapolis; W. W. Sears, Des Moines, Ia.; Nelson T. Hayes, Kansas City, Mo.; George Weber, St. Louis; Horatio L. Hall, Chicago; W. M. Jenkins, Boston; J. A. Cramer, Buffalo, N. Y.; John Van Benschoten, Poughkeepsie, N. Y.; J. M. Cram, Racine, Wis.; Walter M. Cram, Philadelphia; F. L. C. Martin, Plainfield, N. J.; Charles P. Skinner, Warren D. Brown, O. R. DeLamater, George A. Skinner, New York.

Packard Three-Ton Trucks as Sightseeing Buses

Several buses, each accommodating thirty-four persons have been fitted up from regular Packard three-ton truck chassis. Among the places where these will be tried are the Alaska-Yukon-Pacific Exposition in Seattle and private enterprises at Colorado Springs, Col.

Hoblitt to Start Long Trip in Alco—F. M. Hoblitt, known generally throughout the automobile trade as the first traveling man selling motor cars, is to start June 10 on a more novel trip than usual. A couple of years ago, Mr. Hoblitt and Arthur Jervis became known as the "vanadium twins" while exploiting a new six-cylinder car of the American Locomotive Company across the country. Mr. Hoblitt is the traveling representative of the Alco pleasure cars, cabs and trucks. and on his forthcoming trip he will use a 40-horsepower Alco car instead of traveling by train. He will take no chauffeur, but will drive the car himself and carry only one passenger. Mr. Hoblitt's route includes Albany, Buffalo, Cleveland, Toledo, Chicago, Milwaukee, Minneapolis, Denver, Kansas City, St. Louis, Louisville, Columbus, Pittsburg, Philadelphia and New York. This means that he will cover the full route of the Glidden tour as an incidental part of his trip, which completed, will be more than twice the mileage of the Glidden tour.

Whiskey vs. Gasoline—How whiskey, as a substitute for automobile fuel, saved a Japanese nobleman from missing a transcontinental train down in Texas, is the subject of a laughable story in the current issue of the Rambler Magazine, a publication issued in the interest of Rambler owners, by Thomas B. Jeffery & Company. A cartoon showing the progress of the automobile among the farmers of the Southwest is described in an interesting way by Mr. Jeffery, who discovered at the Kansas City automobile show that the Southwest farmer had become so prosperous that he frequently came to town to have his nails manicured. Mr. Jeffery also tells why the farmer is so prosperous, saying, "Wheat in Kansas at $1.30 costs 30 cents to raise, and corn at 75 cents costs 25 cents to raise." This is why the farmers are buying automobiles. Even the manicure lady is pictured in a comic cartoon.

Pacific Coast Wants Enclosed Cars—Within a year or two the Pacific coast will have as many enclosed automobiles as the East, is the prediction of the Pierce-Arrow western dealers who have been at the factory lately. One gave his reasons for this belief thus: "The people on the coast adopted the touring car quickly, and have realized that with the automobile a suburban home is possible, and as accessible as a town house. This has brought into use the enclosed car so that it is serviceable in all kinds of weather, and during the past year we have sold a number of 36-horsepower Pierce-Arrow landaulets and broughams. The use of the lower-powered cars of the enclosed type is bound to bring about a demand for high-powered cars with enclosed bodies. This has been shown conclusively by the inquiries made before I started for Buffalo concerning fall deliveries."

Lots of Business in Syracuse—Due to the rush of orders for light delivery trucks, the Chase Motor Truck Company, Syracuse, N. Y., has been obliged to operate its plant overtime. The factory comprises 62,000 square feet of floor space, to which has just been added two new buildings each 85 by 30 and two stories high. Moreover, even this is not sufficient, and arrangements are now being made for another building of equal size. The most recent addition to the Chase line is a business man's surrey, the construction of which is similar to other Chase cars.

Rambler Revives Road Sign Campaign—With a new issue of 5,000 metal signs for posting at doubtful points on roads, Thomas B. Jeffery & Company have revived a campaign which was started two years ago. At that time a large number of these guides were supplied to automobile clubs or to Rambler dealers throughout the middle West and in some parts of the East, and erected in needed places. The signs are 12 by 24 inches in size, ample to be seen readily, and with the production of the new ones a great many more roads throughout the country will be well marked.

New Departure Bearings on A-K Winner—The New Departure Manufacturing Company, of Bristol, Conn., is calling attention to the victory of the Allen-Kingston car in the Sport Hill climb at Bridgeport, in which car New Departure bearings are used throughout. There are four on the crank shaft, and in this contest demonstrated their workings, which combine thrust with radial load bearings. The A-K covered the distance in its class in 1:18 3-5, and the thrust stresses were severe at certain points along the course.

Continental Increases Factory Space—By the addition of a third floor to its main factory in Muskegon, Mich., the Continental Motor Company will greatly increase its facilities. For several months it has been having difficulty in keeping pace with its orders, although employing 500 men. The erection of the third story will permit the use of 200 more men and will enlarge the output materially. The company claims that it has turned down more orders for the coming year than it has accepted.

Hercules Electric Company Enlarges Plant—Sales of the new magnetos made by the Hercules Electric Company, Indianapolis, Ind., have been increasing so rapidly that greater facilities for their manufacture have become necessary. An additional building has already been constructed, with machine equipment that will increase the capacity of the concern by 50 per cent. Preparations are now being made for the erection of another plant in which the magnets will be made.

Cleveland Concern Gets New Lease of Life—A new company just incorporated has taken over the plant of the old French-American Motor Car Company, Cleveland, O. By a strange coincidence the new concern will be known as the White Motor Car Company, after the backer, W. B. White, who is, however, no relation to and has no connection with the White family in the White Company, makers of White steamers, located in the same city.

Morgan .Leases Building for Worcester Factory—For the manufacturing of automobile trucks, the R. L. Morgan Company, Inc., has leased a three-story building on Cambridge street, Worcester, Mass. The structure is owned by the Crompton Associates, and formerly occupied by the Crompton-Thayer Loom Works. Between 50 and 60 men will be employed shortly, and the plant will have a capacity of 500 cars yearly.

Winton Chauffeurs' Contest Nears End—The Winton Motor Carriage Company, of Cleveland, is receiving records from all parts of the country of chauffeurs who are preparing their reports for the Winton chauffeurs' contest. The month of June is the last for the 1909 season, and already some of the outlines received have been further wonderful evidence of the satisfaction being secured from the Winton product.

Motor Car Equipment Company Leases Building—The entire building at 55 Warren street, New York, has been secured by the Motor Car Equipment Company, of 1727 Broadway, importers and manufacturers of automobile accessories. The additional space will be utilized for the large stock of materials and sundries used in filling the concern's trade saying of "Everything for the autoist but the auto."

Rapid, Too, Needs More Space—After having just completed and occupied the latest addition with a full line of automatic machinery, the Rapid Motor Vehicle Company, Pontiac, Mich., has already found the new quarters too small and has planned a concrete, steel and glass building which will be two stories high, with 76,800 square feet of floor space, the dimensions being 60 by 640.

New Company Proposed in Springfield, Ill.—Plans have been made in Springfield, Ill., for the organization of a new automobile corporation, to be called the Springfield Motor Car Company, with a capitalization of $250,000. It is proposed to erect a modern building in Harvard park, 250 by 500 feet in size, and have it ready for occupancy by fall.

Additional Factory for Salisbury Wheel Company—The Salisbury Wheel & Manufacturing Company, of Jamestown, N. Y., has leased the factory of the Straight Manufacturing Company, and will utilize it as an auxiliary plant. The concern has been working day and night, but has been unable to catch up to its orders. By the addition its capacity will be doubled.

Carpenter Steel Company Opens Hartford Branch—The Carpenter Steel Company, of Reading, Pa., has opened a branch office and warehouse at 189 Allyn street, Hartford, Conn. The business will be under the management of George S. Cairnes, who for many years has been identified with the tool steel trade of New England.

Countryman Automobile Company Retires—The Countryman Automobile Company, Minneapolis, Minn., has sold its business to the Heany Automobile Company of Aberdeen, S. D. The latter firm will retain its location in Aberdeen and in addition handle the Halliday cars from the Motor Mart for Minneapolis.

PERSONAL TRADE MENTION

Otis R. Cook, one of the best known men in the tire trade, and since September last manager of the tire department of the Federal Rubber Co., Cudahy, Wis., has just been appointed general manager, his jurisdiction having been extended to include the mechanical rubber department in addition to the tire department. Mr. Cook will make his headquarters as before at the company's Milwaukee office, corner Oneida and Milwaukee streets.

Frank L. Kingston, of Kokomo, Ind., who is the general manager of the recently incorporated Planhard Manufacturing Company, has been until recently associated with Byrne-Kingston & Company, of that city, of which concern his brother, George Kingston, is general manager. The latter is not identified in any way with the Planhard company.

Henry Haines Hower, well known as a writer on automobile topics, was married to Miss Loise Northrop, at Cleveland, on Tuesday of this week. Mr. Hower is the automobile editor of the Cleveland *Plain Dealer,* and Cleveland correspondent of THE AUTOMOBILE.

Robert P. McCurdy, of Pittsburgh, will have the agency in that city for the Pierce-Arrow automobiles. He has resigned from his position as manager of Banker Brothers, the agents for Chalmers-Detroit and Stevens-Duryea cars.

C. F. Baker has joined the forces of the American Motor Car Company, of Indianapolis, as sales manager. Mr. Baker has been identified for several years past with the Pope Company, at Toledo, O.

OBITUARY NOTICE

F. W. Hedgeland, president of the Hedgeland Manufacturing Company, of Canton, O., died on May 30. Mr. Hedgeland was the inventor of the equalizer which bears his name.

IN AND ABOUT THE AGENCIES

Maxwell, San Francisco, Cal.—The Maxwell-Briscoe Company is preparing to move to its new building at Fulton street and Van Ness avenue, which will be a distributing point for the Pacific coast and the western territory.

Babcock, Cleveland, O.—The Babcock Electric Garage & Sales Company has opened a new establishment on Euclid avenue, opposite Sixty-sixth street, to be devoted exclusively to electric automobiles, in addition to the Babcock.

N. Y. TRADE NAMES CUTTING

General John T. Cutting was elected president of the New York Automobile Trade Association in the recent annual meeting. The choice of the Oldsmobile representative was unanimous, and to serve with him the following were named: First vice-president, C. William Wurster, Stearns; second vice-president, C. P. Skinner, Mitchell; treasurer, Richard Newton, Stoddard-Dayton; secretary, Walter R. Lee, re-elected. The board of directors is made up of the following: C. Andrade, Jr., counsel; Frank Eveland, Stevens-Duryea; William Haradon, Columbia; G. W. Bennett, White; Harry Fosdick, Lancia; W. W. Burke, Mora; Peter Fogarty, Marmon, American Mors, Interstate, and A. J. Inderreiden, Warner Instruments.

General John T. Cutting

The financial report showed that the association is in a very flourishing condition, and a number of important movements are being carried on by it. Among these is the three-day endurance run to be held on June 12, 13 and 14.

NEW AGENCIES ESTABLISHED

Gaeth: Chicago—International Automobile Company, 1243 Michigan avenue.

Hudson: Boston — Whitten-Gilmore Company, for eastern Massachusetts.

Marion: Piqua, O.—H. B. Greenamyer.

RECENT INCORPORATIONS

Mutual Automobile Association, New York.—Capital $50,000. To manufacture automobile and other motor vehicles. Incorporators: F. Haasters, G. L. Clarke, O. B. Bachman.

20th Century Motor Car & Supply Company, Indianapolis.—Capital $60,000. To manufacture automobiles. Incorporators: M. L. Williams, H. E. Keyer, H. L. Wolverton.

Auto Appliance Company, New York.—Capital $25,000. To manufacture shock absorbers for automobiles. Incorporators: W. J. Singer, J. W. Lowell, J. L. Douglass.

Manlius Motor Company, Syracuse, N. Y.—Capital $20,000. To manufacture gas engines and deal in automobiles. Directors: G. A. Fowler, M. J. Topp, W. H. Topp.

Custer Manufacturing Company, Marion, Ind.—Capital $12,000. To manufacture automobiles. Directors: Angela G. Custer, Burr Custer, G. D. Custer, R. J. Custer.

Michigan Crank Shaft Company, Muskegon, Mich.—Capital $10,000. To manufacture crankshafts for automobiles.

Elton Auto Repair Company, Youngstown, O.—Capital $25,000. Incorporators: Fred Tod, Albert Elton, B. M. Campbell.

RECENT PUBLICATIONS

Fried-Ostermann Company, Rockford, Ill.—Price automobile gloves are well described in a beautiful little booklet issued by the Fried-Ostermann Company, of Rockford, Ill., the successor to the H. W. Price Company. The catalogue is printed in colors and with designs that are very attractive, aside from their value in an advertising sense. The cover is a pretty color plate of a man and a woman in an automobile, showing Price gloves on their hands, but not making them so exceedingly prominent to detract from the picture itself. This is true also of the frontispiece. The catalogue describes a great many kinds of gloves and gauntlets, in colors, telling of their quality, goods and price. The cuts are all so clear that a pair of the articles might be ordered without having really seen them, and yet their appearance would accurately be known.

Buckeye Jack Manufacturing Company, Louisville, O.—Automobile jacks in six sizes are manufactured by the Buckeye Jack Manufacturing Company of Louisville, O., with capacities of one ton, except one style with a lifting capacity of 1,800 pounds. This concern is well and favorably known as a maker of compound lever truck and automatic jacks, especially for use on railroads, and the automobile devices are made of the same quality of material as used in the machines which can lift 15 tons. These are all described in catalogues recently issued, giving detailed specifications, such as raise of bar, weight, price, size of base, and other particulars of interest both to the manufacturers who supply jacks with their complete automobiles or to the owner who is equipping a car.

THE ELECTRIC CARRIAGE

By the Waverley Poet

It does not shy at papers as they blow along the street,
It cuts no silly capers on the dashboard with its feet;
It does not paw the sod up all around the hitching post,
It does not scare at shadows as a man would at a ghost;
It does not gnaw the manger, it does not waste the hay,
Nor put you into danger when the band begins to play.

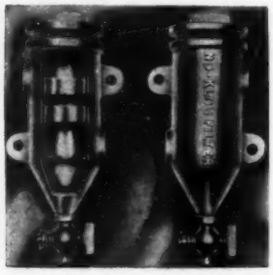
It makes no wild endeavor to switch away the flies,
It sheds no hair whatever to get in mouth and eyes;
It speeds along the highways and never looks around,
For things that it may scare at, and spill you on the ground;
It does not mind the circus—it's not at all afraid,
And does not overwork us when the elephants parade.

It does not rear and quiver when the train goes rushing by,
It does not stand and shiver when the little snowflakes fly;
It does not mind the thunder nor the lightning's blinding flash,
It does not keep you chirping and connecting with the lash.

When you chance to pass its stable you do not have to care,
Or cluck for all you're able to keep from stopping there;
There's no one to arrest you if you do not treat it right—
It will work all through the daytime and still be fresh at night.
It's a thing of proper manners which it shows in various ways,
So that all men and women are saying nowadays:
"It may once have been the thing to 'hitch your wagon to a star,'
But now to be quite in the swim you must hitch to a Waverley Car!"

Information for Auto Users

No-Klog Gasoline Filter—While it is a well-known fact that the fuel used in automobiles is very carefully guarded against dirt and water, it is also a fact that any car with a good filter will give better results than one without. To supply this need the Standard Gasoline Filter Company, Attleboro, Mass., is putting out the No-Klog filter, which has a number of excellent features to commend it. The filter serves a fourfold purpose, as it extracts dirt, separates out water, by purifying the fuel increases the power, and acts as an auxiliary reservoir. In its construction the best of brass is used, the design being such as to allow the ready removal of the strainers, the withdrawal of the entrapped water, has standard pipe connections for all commercial sizes, and fine threads, twenty to the inch, which aid in keeping the elusive gasoline from leaking away, as well as keeping out objectionable dirt and other foreign matter. The device is small, compact, not expensive, attaches in any position whatever, and is readily put on or taken off. The makers state that no autoist who has ever tried one and found out the benefits to be derived from it would thereafter be without one.



NO-KLOG GASOLINE FILTER

Displayed a Marked Fondness for the Bottle—In the recent spectacular parade of the New York Trade Carnival, the float representing the Thermos bottle

THERMOS BOTTLE FLOAT IN PARADE

was enthusiastically received, the applause all along the route, and the awarding of the second prize seeming to indicate the marked fondness for "the bottle" in general and the Thermos bottle in particular. The float was a gigantic representation of a Thermos bottle laid on its side, enthroned upon which was a beautiful young woman driving a flock of white doves with ribbons. The wheels were hidden by stationary shields so that no motion could be seen, and the effect of the flying dove providing the motive power for the vehicle was complete. The bottle is made by the American Thermos Bottle Company.

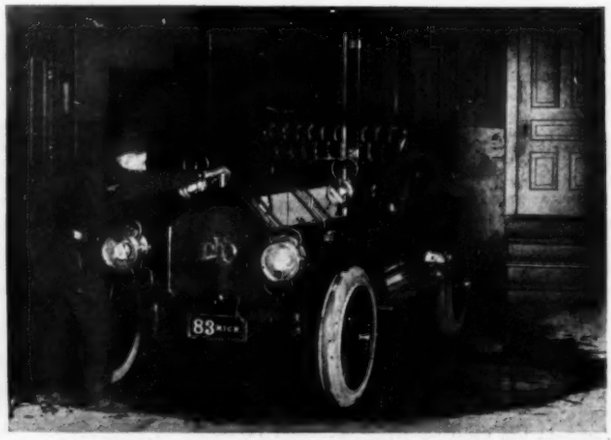
Quick-Detachable Pump Connection—Speed is the cry to-day, and in the interests of obtaining this much-desired quality, even the little accessories are receiving their share of attention. A very new one, right up to the minute, so to speak, is the pump connection, a very minor accessory. Yet a new pump connection is now being marketed, which has the desired quality incorporated in its construction. This is the "Grab" connection, the name having been selected as indicative of the method of

GRAB PUMP CONNECTION

working. It differs from the usual connection in that the fastening is a clamp and not a screw or push connection. This allows of the rapid attachment or removal, and as it will fit any valve, with no chance of getting out of order, is doubtless in line for popular adoption. The makers' claim of simplicity and fool-proof construction is seen to be well founded. It is sold by the Motor Car Equipment Company, 1727 Broadway, New York City.

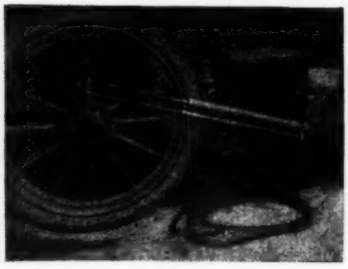
A Ball-Bearing Turntable—Many automobile accidents are caused by cars backing out of garages and other places, through inability to turn in the limited space within. To overcome this, a turntable provides a means of turning a car in its own space, and every garage should have one. The Lansing Wheelbarrow Company, Lansing- Mich., is the manufacturer of an efficient device of this sort. This light, but strong, turntable, is built right into the floor of the garage and, being mounted upon ball bearings, turns very readily even with the heaviest machine upon it. The turntable not only avoids the chances of accidents due to the backing out process but removes the possibilities of damage to the machine itself on the curbstone or otherwise, and represents less heavy labor and therefore better work on the part of the employee.

In the illustration of the turntable in practical use in a garage, a car is shown in place with a man working upon it, the whole showing how readily one man may handle even a very heavy car when placed upon the turntable, the latter operation requiring possibly three or four men. In this way the saving due to the use of one of these devices is pictured in a striking manner.



CAR ON LANSING WHEELBARROW COMPANY'S TURNTABLE

Let the Auto Do the Work—In the inflation of tires by the old back-breaking way, with a hand, or, as it is sometimes called, a foot pump, much good energy was wasted which might have been put to an otherwise good use. The modern way of inflating tires takes care of this and now there are on the market a number of mechanical means of doing



E-Z TIRE PUMP READY FOR USE

this work. One of the best of these is the E-Z Auto Pump Attachment, made by Wheaton & Cummings, Sunbury, O. This works on the eccentric principle, that is, the free end of the pump is fastened to the spokes of the wheel, which, of course, would place it off center or eccentric. The amount of this eccentricity determines the stroke of the pump. The other or delivery end may be fastened to the running board, or it may be placed on the ground or floor and held with the foot. The revolution of the wheel, which had previously been jacked off the floor so as to be free to rotate, operates the compression and delivery of air to the desired place. The whole outfit is very simple, consisting of a pump barrel with a hinged foot plate, and the clamps to fasten the driving end to the wheel. Being so simple or composed of so few parts, it is readily attached to or detached from the wheel.